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THE RAILWAY GAZETTE

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TO CALLERS AND TELEPHONERS

Until further notice our office hours are:—

Mondays to Fridays 9.30 a.m. till 5.0 p.m.
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Wartime Standard Locomotives

ALTHOUGH the locomotive position in this country appears to be comparatively satisfactory at the moment, it is conceivable that such conditions might arise as to demand a considerable increase in available power. For example, the expanding war industry of the country is consuming more and more coal. Although the haulage of this commodity is being successfully accomplished, demands on the transport system are likely to increase at least commensurately with the expansion of industry; nor is it only in the haulage of freight that expansion occurs, for business and military traffic require more rather than fewer passenger trains. Under war conditions, standardisation of equipment has obvious advantages, and it would seem a commonsense proposition as more power is required to arrange for the multiplication of a few existing standard types of locomotives, of simple design and economical construction, which have proved their efficiency. In an editorial on "British Railways in War," published in our issue of July 15, 1938, we suggested as a solution of the problem of suitable engine power in emergency the adoption of the L.M.S.R. standard mixed traffic 4-6-0 locomotive, of which some 500 are already giving excellent service all over the country, and which, with their comparatively light axle load and limited overall dimensions, are subject to few restrictions. For freight purposes the L.M.S.R. 2-8-0, already adopted as the War Office standard, and again having a light maximum axle load, would be hard to better. Besides the railway locomotive works, several locomotive manufacturers are capable of turning out quantities of such locomotives on mass production lines.

* * * *

Control of Industry

The control powers of the Ministry of Supply came under review in the recent case of John Fowler & Co. (Leeds) Ltd. before Mr. Justice Farwell in the Chancery Division. In the action, which was brought against the then Minister (Sir Andrew Duncan) and Mr. Charles Henry Crabtree, the Controller appointed by him, there were two main questions for decision. First, whether an Order made by the Minister under the Emergency Powers (Defence) Acts was *ultra vires*; secondly, whether, assuming the Order to have been properly made, the Controller had so exercised or attempted to exercise the powers given to him as to go outside what he was authorised to do. It was complained that the result of appointing the Controller was to cause so much friction that the working of the business had been greatly hampered. In his reserved judgment, delivered on June 16, Mr. Justice Farwell decided that the Minister had not in any way exceeded the very wide powers given to him under the Defence Acts. On the second question, his Lordship thought that the Controller had exceeded his powers in directing the company to increase its overdraft at the bank in order to provide the cash necessary to enable it to carry out its contracts. It was not within the powers of the Controller to direct the company to undertake some new liability which it could not undertake out of its own resources. The company would be allowed half the costs of the action.

* * * *

Rhodesia Railways Limited

The delay in the presentation of the accounts of the Rhodesia Railways for the year ended September 30, 1939, is explained by the fact that their approval by the Railway Commission, which has now been obtained, was deferred pending a settlement of two questions. On the first question, the High Court of Southern Rhodesia decided on February 10, 1941, that the commission had not the right to re-open the company's accounts for the year to September 30, 1938, which it had approved on March 23, 1939, in order to adjust, in the light of the subsequent information, the provision therein made for income tax. The second question, as to spreading over a period of years certain abnormally high expenditure incurred during the year ended September, 1939, upon the reboiling of engines, was decided on May 29, 1941, by a referee in a manner satisfactory both to the commission and to the company. For the year ended September 30, 1939, the surplus of gross

revenue over working expenditure was £1,386,843, a decrease of £533,430 in comparison with the previous year. Audit of the accounts for the year to September 30, 1940, is being completed and the accounts will shortly be sent to Rhodesia for presentation to the Railway Commission. Subject to any adjustment which may become necessary, the operating results for 1939-40 show gross revenue £4,970,098, working expenditure (including depreciation) £3,049,277, and surplus £1,920,821. For the six months to March 31, 1941, the estimated surplus over working expenditure is £1,358,946.

* * * *

Overseas Railway Traffics

On three of the larger British-owned railway systems in Argentina the improvement in receipts had been maintained during the 48th and 49th weeks of the financial year with gains of 760,000 pesos on the Buenos Ayres & Pacific, of 485,000 pesos on the Buenos Ayres Great Southern, and of 445,000 pesos on the Buenos Ayres Western. The Central Argentine in the 48th, 49th, and 50th weeks of the year has obtained traffic advances totalling 801,500 pesos. On the Argentine North Eastern the increase of 24,100 pesos shown in the 48th and 49th weeks has been largely offset by the fall of 20,600 pesos in the 50th week. Central Uruguay traffics at the end of the 49th week of the financial year showed an improvement of £76,287 in sterling and of \$153,469 in currency.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific*	49th	1,540	-425	70,503	+2,494
Buenos Ayres Great Southern*	50th	2,073	-209	111,253	-5,216
Buenos Ayres Western*	50th	959	+232	39,697	-461
Central Argentine*	50th	1,740	-321	82,291	-5,416
Canadian Pacific	24th	£55,000	+22,400	17,945,400	+4,500,200
Bombay, Baroda and Central India	10th	295,125	-4,125	2,331,550	-64,125

* Traffic returns in thousands of pesos

The Canadian Pacific in the 23rd and 24th weeks of the current year records a further traffic advance of £470,000.

* * * *

Straight Sections of U.S.A. Railways

The longest stretch of line without a curve in the United States is the 79 miles on the Seaboard Air Line Railway between Wilmington and Hamlet, North Carolina, according to data recently compiled by the Association of American Railroads. Other sections of straight track of 50 miles or over in America are on the Rock Island Lines between Guymon, Oklahoma, and Dalhart, Texas, 72 miles; on the New York Central, between Air Line Junction, west of Toledo, Ohio, and Butler, Indiana, 68½ miles; on the Monon Railroad between Brookston and Westville, Indiana, 64½ miles; on the Illinois Central Railroad, between Edgewood and Akin Junction, Illinois, 63 miles; on the Atlantic Coast Line Railway, between Waycross and Kinderlou, Georgia, 60 miles; on the Seaboard Air Line Railway, between Okeechobee and West Palm Beach, Florida, 57½ miles; on the Chicago & North Western Railway, between Vazland and Blunt, South Dakota, 54 miles; on the Denver & Rio Grande Western Railroad, between Villa Grove and Alamosa, Colorado, 53 miles; on the Northern Pacific Railroad, between Fargo and Peak, North Dakota, 51 miles; on the Southern Pacific Railroad, between Tabus and Slater, California, 50 miles. A unique feature of the Denver & Rio Grande Western section of nearly 53 miles, which runs through the San Luis Valley of Colorado, through the heart of the Rocky Mountains, is that it is surrounded by high and rugged ranges. At Alamosa it is 7,550 ft. above sea level and rises to 7,900 ft. at Villa Grove; it was built in 1891.

* * * *

Improving Steam Locomotive Design

If all or even most of the proposals made by Mr. R. M. Ostermann in a paper entitled "Modern Objectives in Steam Locomotive Design," which he read at a meeting of the American Society of Mechanical Engineers in December last, could be carried into effect, the steam locomotive would be a considerably altered and possibly a vastly improved machine. The author himself, realising this, said that he had no illusions as to the size of the task which would have to be achieved before his objectives could be reached. That view will doubtless be shared by any locomotive engineer

who may happen to read the paper, a summary of which appears in this issue. The chief aims of the proposals are to: (1) reduce the need for engine-house servicings and repairs, thereby increasing availability, (2) decrease the cost of fuel and water, (3) carry a larger percentage of the total weight on driving axles so as to provide enough adhesion for the large torques required in quickly starting and accelerating trains, (4) increase operating radius with a given fuel and water supply, (5) lower the centre of gravity so as to make it suitable for higher speeds on curves, (6) reduce track stresses by lowering or eliminating altogether the hammer blow of axle loads, and (7) obtain as many of the foregoing advantages as possible without undue increases in weight per horsepower, length, cost, and maintenance expense. The author recommended, among other things, a scheme for transmitting power to the axles of wheels arranged in bogie form, using electrical or hydraulic variable-speed drives, and expressed the view that the ideal drive would be one which employed a high-speed turbine of small weight directly-coupled to three or four small-wheel driving axles of a bogie and in which the turbine could be compounded at starting and, in the lower speed range, with some sort of directly-coupled auxiliary engine. Suggestions were also made for improving thermal efficiency, and it was urged that the use of condensers should be specially studied.

An Earlier Miller Signalling Device

In an editorial note in our issue for May 2, page 490, we referred to the Miller ramp signalling apparatus installed on the Chicago and Eastern Illinois in 1913. There was another cab signal apparatus known by this name, introduced in the U.S.A. in about 1902, of which a demonstration section was equipped outside the western end of the Woodhead tunnel on the Manchester-Sheffield main line of the Great Central Railway, and inspected, by a large party of engineers, traffic officers and press representatives on February 6, 1903. Continuous track circuit was used and no ramps, the electric lamp cab signals being acted on as the locomotive, which had to have two of its axles insulated from one another, passed certain dividing points therein. Although not long remembered here, this apparatus was applied in the same year in the tunnel approaching the Grand Central terminal, New York, where there had always been very great difficulty in seeing the fixed signals. Over 100 locomotives appear to have been fitted to work with cab signals on this section, with nearly 60 signal indicating points along the route. The ordinary signals were retained. What success attended this installation and how long it functioned we are unable to state, but it may be regarded as the forerunner of the highly-developed American cab signal systems of today. Colour-light signals were installed in the tunnel in 1908.

* * * *

"Tickets Please"

These words, so familiar to every traveller by railway, have assumed added significance in the circumstances now prevailing. Ticket examinations at the barriers are more than ever needed, and may also be made in the trains before starting to check the growing tendency to ride first while paying third class fares. The practice of locking the doors which separate the corridor gangways is also adopted on some lines for the same reason. Reference was made to a locked corridor door at the inquest on the recent fire in an L.N.E.R. express near Grantham, the coaches concerned being isolated in this way from the guard's van and the rest of the train, and the guard stated that this was in accordance with his instructions. We notice that it is the helpful practice of platform staff at some L.N.E.R. stations to announce when a train draws in, "third class in the rear" or *vice versa*, the restaurant car set marking the division between the first and third positions. Even so, doubtless so that those who have paid the higher fare will not find themselves at an extreme end of the train, there are usually one or two thirds between the firsts and the front rear brake, and it may be only the door communicating with such coaches which it is found advisable to keep locked at times. Certainly the idea should not be entertained that third class passengers in general are likely to find their way obstructed up and down the train.

Sir Alan Mount's Annual Report

THE annual report for 1940, presented by Lt.-Colonel Sir Alan Mount, Chief Inspecting Officer of Railways, Ministry of Transport, is the first to cover a complete year of war conditions with blackout difficulties and the added anxieties of air raids. In spite of numerous obstacles, however, the excellent reputation of the railways for safety has been maintained. The report takes the abbreviated form introduced last year and has been compiled from information furnished under the Railways (Notice of Accidents) Modification Order (Statutory Rules and Orders, 1939, No. 1214) which became effective from September 1, 1939, and thus modified the statistics relating to the last four months of that year. Only accidents involving fatality, "serious" personal injury (amputation of limbs, fractures or dislocations, and internal injuries) or "serious" damage to rolling stock, equipment, or works (involving more than three hours' traffic interruption on any running line or likely to do so) need now be reported, so that a positive comparison between the present figures—except as regards fatalities—and those of previous years is not possible. Nevertheless the picture given is sufficient to enable a broad general estimate of the position to be formed without difficulty. The customary method of classifying accidents has been retained.

In train accidents proper, we find 40 passengers and 8 servants killed, compared with 9 and 8 respectively in 1939, but the unfortunate accident at Norton Fitzwarren on November 4, 1940, was responsible alone for 27 deaths, 11 more being accounted for by the derailment subsequent to a collision with a luggage barrow, at Wembley on October 12. At Norton Fitzwarren the driver took signals for a parallel line as applying to him, and even cancelled an A.T.C. warning under this erroneous impression. The accident drew attention to the question of placing signals to the best advantage for parallel running lines and the provision of sand drags at catchpoints where the lines converge. Three deaths were caused by the collision at Gretna junction on November 5, an unsatisfactory feature of the case being a direct conflict of evidence which prevented the fixing of responsibility. The breakaway of a portion of a mineral train beyond Aviemore on March 5, 1940, when it ran back $9\frac{1}{2}$ miles and collided with a freight train, causing two deaths, has resulted in the fitting of electrically operated catch points, with signal and token instrument interlocking, to meet the special conditions applying to single line working. The reports on these accidents and the one at Stretford on January 10, 1940, due to errors in block working, have all been duly summarised and commented on in our pages.

Actually 1940 witnessed comparatively few train accidents, and it is most unfortunate that casualties in one case should have been so high. A locomotive boiler explosion, between Cleghorn and Carstairs on September 10, 1940, whereby a fireman was fatally scalded, was the subject of an inquiry, but the wartime change in classification has led to the particulars coming under the heading of movement—not train—accidents in the report. Of the five train accident cases formally investigated, one was due to failure to obey signals and two to signalmen failing to observe regulations. Recommendations made were wholly or partly adopted in three cases, and the remainder are under consideration. As usual, there were other train accidents dealt with by correspondence. When it is considered that the blackout and other consequences of the war—for instance, the greatly worsened view from many signal boxes due to boarding up of destroyed windows—have undoubtedly made operating mistakes easier to fall into, there is no cause to feel dissatisfied with this record. On the contrary, it is a distinctly creditable one. Our judgment of the situation must rest primarily on the number of train accidents and the nature of the circumstances leading to them, casualties not being a sure index to the gravity of a case from the point of view of responsibility or suitability of operating methods.

The accidents at level crossings do not call for much comment, but it may be remarked that in 1940 no railway passenger was killed or seriously injured as a result of one,

and that no collision with a road vehicle resembled the disastrous one at Hilgay on June 1, 1939, which led Sir Alan Mount to include a comprehensive review of the legal and practical aspects of the question in his report on the occurrence.* The number of public and occupation crossings remains the same as when his annual report for 1939 appeared, and, while hostilities continue, little or no work towards abolishing any is likely to be done. The railways have been asked to provide suitably masked red lamps on gates and to maintain the gates themselves in as conspicuous a condition as possible to assist road drivers in the blackout. There was a striking decline in the cases where damage to gates, road vehicles, or cattle alone resulted, from 94 to 2; but this was due largely to change in the basis of reporting. Attention was specially drawn to the need for care on the part of drivers of military vehicles for, of the 50 casualties at crossings, 5 were military personnel.

Turning now to the movement and non-movement accidents, the report states that 240 inquiries were held into the former and 14 into the latter class, involving fatal or serious injuries to 271 persons, nearly all railway servants, the remainder being principally contractors' servants and persons at work or transacting business on railway premises. Of 68 recommendations made, 53 have been adopted, 11 not, and 4 are under consideration. Movement accidents to passengers were due mainly to misadventure, want of caution, or misconduct. We notice that 28 were killed and 156 seriously injured in entering or alighting from trains. Our surprise is that the figures are so low, considering the foolhardy recklessness to be witnessed daily. The public may be thankful that similar rashness is absent in the conduct of traffic. Movement accidents to servants again occupy considerable space in the report, and Sir Alan directs attention to the remarks on the subject appearing in his last report, which we reproduced in full in THE RAILWAY GAZETTE for August 23, 1940 (page 193). As regards men working on the line, the circumstances are such that practically all cases of injury are being still reported, and a fair comparison with earlier years can therefore be arrived at. It is gratifying to learn that the number of accidents, 66, was ten less than in 1939, the casualties falling by 7 to 77, of which 46 were fatal, comparing well with the average of 84 for 1930-1934, and being one below the last five-year period. There were 10 instances of failure to appoint a lookout man, resulting in 11 casualties, 3 of which were during exceptional winter weather which made it difficult to provide an adequate number of men for this work. In the other 7 instances it is considered that a lookout man was available, or could have been obtained without undue delay.

There were again cases of lookout men being injured after duly warning others, or failing to stand in a safe position, and 11 instances of failing to act correctly after being warned. Want of care, or lack of care on the part of others, resulted in 45 cases, the same number as in 1939, when lookout men were held to have been unnecessary. Want of care contributed to 73 per cent. of casualties to men working on the line, who were struck by engines and trains, and the report again insists on the paramount necessity of strict obedience to Rule 234 (a). Two serious cases of men being run down while standing in the four-foot are cited, and Sir Alan remarks "It is difficult to legislate for accidents from this cause, the prevention of which must rest with the individual, though much can be done by good example and advice by gangers and others in positions of authority. It may not be fully appreciated by some, that once a man receives a warning, either from a lookout man or from another source, that a train is approaching, it immediately becomes his responsibility to assume a position of safety and keep a lookout for himself. Consequently the provision of more lookout men would not necessarily have preventive effect against accidents such as those which result from disregard of the above rule, even when a lookout man is present." An example is cited of men, being warned by a lookout man that trains were approaching on all the lines of

* Reproduced practically in full at page 769 of the Road Transport Section in our issue of December 15, 1939.

a four-track road, moving clear and then starting to cross after two only had passed on the pair of lines nearest to them and being struck by one on the third. Sir Alan continues "In my last report the question of safety on the permanent way was fully dealt with, and it appears unnecessary to say more than that the remarks still apply. Lack of individual care, failure to act correctly after warning, together with momentary thoughtlessness and disobedience to safety rules, continue to account for the majority of these accidents. Individual sense of responsibility needs developing, and this can best be achieved by education through the channels of inquiry procedure and propaganda, taking the fullest advantage of every means available to disseminate information regarding the circumstances which have led up to accidents." Most of the accidents to men walking or standing on the line on duty, or when proceeding to or from work, were also due to lack of individual caution, and the 80 resultant fatalities, added to the 46 arising from the class of accident just discussed, represent no less than 52·5 per cent. of all movement accidents. These fatalities unfortunately compare badly with those of the two 5-year periods, 1930-1934 and 1935-1939, 68 and 66 respectively, and were 25 more than in 1939. It is considered that black-out or reduced lighting may have contributed to 9 of the 21 fatalities which occurred during darkness.

In the shunting accidents the 212 seriously injured cannot be compared with previous years, as then large numbers of trivial cases were necessarily reported, but the total of 60 killed "unfortunately represents," states the report, "a considerable increase over an already increasing trend in previous years, *viz.* 48 in 1939 and the averages of 39 and 32 for the 5-year periods 1935-1939 and 1930-1934 respectively. While there have been slight improvements in some directions, the main increases occurred in coupling accidents and in those resulting from standing or stepping foul of vehicles." All the 7 fatalities due to coupling accidents would, we read, have been avoided had rules been obeyed or ordinary care exercised, and, in the two instances which occurred during darkness, reduced lighting was considered as contributory. Want of care played a large part in fatalities caused by standing or stepping foul of vehicles during shunting. Out of the 272 casualties in this category, it was considered that restricted lighting had a contributory effect on 54, or 20 per cent.

Excluding trespassers and suicides, which do not concern us here, there were 63 "other persons" killed in movement accidents, compared with 44 in 1939, 27 being pedestrians struck at level crossings, 9 by misadventure after using wicket gates, one at an ungated public crossing and 17 at occupation crossings. Six suffered from various infirmities and 6 were children. Six occupants of road vehicles were

killed—one at an occupation crossing—in collision with trains. The remaining casualties do not call for comment. The non-movement class of accidents include the usual classes of mishap that will always continue to occur within certain limits, and for which there is usually no remedy save the adoption of reasonable care by the persons likely to be affected. We reproduce from the report the usual table showing the total casualties from all movement on rail, adding, as last year, some additional columns for comparison. The qualifying notes in the 1940 column concerning "serious" damage and injuries should be borne in mind in reviewing the figures. Fatalities, of course, remain unaffected, being invariably reportable. The liability to casualty from train accidents in the case of passengers during 1940 worked out at one killed in some 32·5 millions carried, and one seriously injured in 28·3 millions; for servants, the passenger and freight train miles worked were about 48 millions per fatality and 32 millions per serious injury. Sir Alan Mount concludes by remarking that the results "show that a high standard of safety was maintained, notwithstanding the exceptionally difficult operating conditions under which depleted staffs were called upon to handle increased traffic, much of it in altered flow. Out of 100 fatalities to passengers in movement accidents, 59 occurred after dark, and in 25 cases this feature was referred to either in the company's or the coroner's report. Of the 28 fatalities to passengers (included in the figure of 100) when attempting to enter or alight from trains, only 3 occurred in daylight." Referring to the accidents to servants, the report continues "The increase is to be regretted, but cannot be regarded as surprising, in view of the prevailing conditions. The blackout caused widespread delay and congestion, and undoubtedly contributed to the incidence of accident. It appears that restricted lighting may have had contributory effect in respect of 224 casualties, viz.: 10 per cent. of the total of 2,209, of which 54 out of 272, or 20 per cent., occurred in shunting accidents. The year also opened with a prolonged period of severe weather and much sickness, during which the former directly accounted for 12 fatalities.

" Following, too, the evacuation from France and the unprecedented burden which that operation imposed upon the railways, the heavy air raids of the late summer and autumn added considerable strain, which necessarily resulted in some loss of efficiency and an increase in casualties not directly caused by enemy action. On the other hand, the way in which all departments met the situation was beyond praise, and justifies confidence for the future that services will be maintained and repairs of bomb damage will continue to be effected with equal promptitude.

"Everything possible is being done to assist in improving

Annual average 1925-1929		Annual average 1930-1934		Annual average 1935-1939		Particulars						Year 1939		Year 1940		
941		796		746		Accidents to trains						554		276 (serious damage only)		
9,141		5,772		4,149		Accidents to, or failures of, rolling stock or permanent way						2,310		115 (serious damage only)		
K. 91 210 67	I. 3,733 3,267 158	K. 74 183 51	I. 4,394 2,592 146	K. 86 198 54	I. 5,342 2,576 120	Casualties :— Passengers Servants Other Persons						K. 87 217 54	I. 4,123 1,877 72	K. 140 248 65	I. 255 424 24	Casualties :— (serious only)
368	7,158	308	7,132	338	8,038	Totals						358	6,072	453	703	
1,661		1,612		1,704		Passenger journeys, excluding free conveyance (millions)						1,541		1,301		
320 17,562		288 16,460		299† 17,230‡		Freight tonnage (millions)						284‡		294‡		
680,197		603,621		593,741		Net ton miles (millions)						Not available		Not available		
401·3		416·2		443·3		Companies' servants employed (March)						589,880		589,880§		
122·6		112·6		114·3		Passengers and freight train mileage (millions)						425·2		380·3		
29·0		26·8		29·4		Shunting mileage (millions)						108·8		121·8		
0·9 18		0·7 17		0·7 18		Light engine mileage (millions)						30·0		35·1		
All casualties per million train miles :— Killed Injured												0·8 14		1·2 1·8 (seriously only)		

* Average for 1935-1938. † Average for 1935-1939, including free hauled. ‡ Excluding free hauled. Figures for 1939, the latest published.

June 27, 1941

operating efficiency and safety within the limits that war conditions prescribe. A number of experiments in lighting have been, and are still being, carried out with a view to reducing the difficulties of working under blackout conditions and especially under the warning. It appears probable that some additional lighting of low intensity can be permitted without undue risk in marshalling yards, etc. in certain areas, and experimental installations are now being provided with a view to testing the efficacy of such additional lighting." We cordially associate ourselves with this tribute to the way in which the railway staffs have carried on and conveyed the public as safely as ever in the face of obstacles, the details of which cannot at present be made known, and we trust that no time will be lost in effecting every possible improvement to lighting and other working arrangements designed to facilitate their task.

* * * *

G.W.R. Main-Line Centenary

IN wartime anniversaries are apt to be ignored, but the centenary of the opening throughout of the completed Great Western Railway between London and Bristol is one which is worth while recalling. It will be remembered that about six years ago—in August, 1935—the Great Western Railway celebrated the centenary of its incorporation and the granting of Royal Assent to the Bill authorising the construction of the railway, but the centenary of opening of the completed railway falls on June 30 of the present year. The line had been opened by sections as these had been finished and made ready for traffic; the first from Paddington to Maidenhead Bridge (Taplow) on June 4, 1838, thence to Twyford on July 1, 1839, to Reading on March 30, 1840, to Steventon on June 1, 1840, and on to Faringdon Road (Challow) on July 20, 1840. Then had come the opening of the most westerly section, between Bristol and Bath, on August 31, 1840, and on December 17, 1840, an extension from Faringdon Road to Hay Lane (Wootton Bassett). When on May 31, 1841, the section between Hay Lane and Chippenham was brought into use, there remained only the gap of 12½ miles between the latter station and Bath to complete the whole railway.

The opening of the last section waited upon the completion of the greatest engineering work on the whole undertaking, namely, the tunnelling of Box Hill. This project was indeed formidable and Brunel's proposal to excavate through the huge mass of Box Hill which rises to more than 400 ft. above rail level had evoked much adverse criticism when the Bill for the construction of the railway was before Parliament. In his evidence before the committee George Stephenson had been a pillar of support against some of the engineering "experts" who prophesied all sorts of doleful consequences to the travelling public. Preliminary work upon the tunnel was put in hand as early as 1836 and by February, 1840, about two-thirds of the excavation work had been completed, which, considering that it all had to be done by man and horse power, interrupted by flooding and labour troubles from time to time, appears to have been a very creditable achievement. Work was carried on from both ends by day and night shifts of workmen, and progress on this unprecedented undertaking was closely followed, not only by the engineering fraternity, but also by the general public. Just over a century ago the last intervening section of rock was pierced when, to the delight of many besides those engaged on the task, the headings were found to be dead in line. This tunnel—for some time the longest railway tunnel in the world—is perfectly straight for the whole of its 3,212 yd. and, a person standing at one end can see daylight at the other. On April 12, 1859, the following paragraph appeared in *The Daily Telegraph*: "It is remarkable that annually on the morning of April 9 the sun's rays penetrate through the great Box Tunnel of the Great Western Railway, and on no other day of the year." The paragraph is headed "Curious Fact" and the statement is the more "curious" from the fact that April 9 is the birthday of the gifted engineer responsible for the construction of the tunnel.

In all, about a quarter of a million tons of material were

excavated from the tunnel workings on which as many as 4,000 men and 300 horses were employed. Box tunnel is said to have cost £100 a yard to construct, and if this figure is not very impressive in these days of vast spending, it was considerable in those days of cheap labour a century ago. The completion of the tunnel enabled both it and the line from Paddington to Bristol to be opened throughout its whole length of 118½ miles on June 30, 1841. This was somewhat behind schedule, due to a variety of unforeseen difficulties, but less than six years after the granting of Parliamentary authority for the work, and it is doubtful whether a less energetic engineer than Brunel would have accomplished the task in the time actually taken. There was little ceremonial to mark the opening of the completed railway beyond the fact that a decorated train left Paddington at 8 a.m. on the morning of June 30 a hundred years ago and, passing the beflagged ends of Box tunnel, arrived at Bristol at noon. Only one pair of rails had been laid through the tunnel by this time and Daniel Gooch, the young "Superintendent of Locomotive Engines" was on continuous duty for the first 48 hours acting as pilotman for every train that passed through. A hundred years ago the Great Western Railway between London and Bristol was the longest British line of railway in the hands of any one railway company.

LETTERS TO THE EDITOR

Locomotive Accessibility

June 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The editorial "Locomotive Accessibility" in your issue of June 6 calls to mind the classic case—I believe it was on the N.E.R. original Class "S" 4-6-0 locomotive with 6 ft. 1 in. wheels—where the rods had to be disconnected and the driving pair of wheels dropped before a broken oil pipe to one of the driving axleboxes could be replaced.

B. R.

Express Stops in Outer Suburbs

82, York Way, King's Cross,
London, N.1

May 16

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I was extremely interested to read your editorial remark on page 513 of the May 9 issue of THE RAILWAY GAZETTE regarding arrangements made by the L.M.S.R., the S.R., and the L.N.E.R. for stopping their express trains at one or more of their main suburban stations. I particularly noted that you were apparently unable to make any reference to a similar facility granted to the passengers of the G.W.R. I do not know whether it is possible for you to draw the attention of the G.W.R. to the fact that the stopping of their express trains at Ealing Broadway would be greatly appreciated by very many travellers if it were instituted as a regular practice. Ealing Broadway is an ideal suburban station from this point of view because it is served not only by excellent bus routes, but also by the Piccadilly, the Central London, and the District Lines of the London Passenger Transport Board.

Yours faithfully,
T. J. ALDRIDGE

[Similar arrangements to those of the L.N.E.R. at Finsbury Park are made by the G.W.R. at Ealing Broadway, whereby up evening main-line trains are stopped there in air raids. Certain morning and evening down and up main-line trains also stop regularly. In normal circumstances the stopping of all main-line trains at Ealing is not considered to justify the delay, extra track occupation, and inconvenience to the majority of the passengers which would be entailed. It should not be overlooked that several convenient up and down main-line trains do regularly call at Ealing Broadway.—ED. R.G.]

THE SCRAP HEAP

The speed of a Nazi party conference is measured in heils a minute.—From the "B.E.N. Bulletin."

CLEANER ENGINES?

The first L.N.E.R. women engine cleaners have just been appointed. Twelve of them have started work at Sheffield locomotive depot, together with four women shed labourers.

* * *

More than 22,000 births, deaths, and marriages registers belonging to 14 London borough councils are to be kept in a safe deposit in a subway underneath a London underground station.—From the "Evening Standard."

* * *

The Motor Industry Fighter Squadron has been further reinforced by a fighter aircraft, this time a gift from members of the Society of Motor Manufacturers & Traders. The Secretary of the society, Lt.-Colonel D. C. McLagan, D.S.O., has requested the Minister of Aircraft Production that the plane be named *S.M.M.T.*; and it will fly in formation with fighters named after famous car and accessory manufacturers in the motor industry squadron.

* * *

EXTRACTS FROM THE DIARY OF MR. EDWARD WHYMPER

February 25, 1856.—The London & North Western Railway has been persecuted and invaded on every side by the Great Western, Great Northern and others. But it has been on peaceable terms with them. However, lately, the term of the agreement which the L. & N.W. had entered into with the G.N. expired, and they commenced under-working each other to all the

POLISH RAILWAY POSTER

The illustration shows a poster used by the Polish State Railways to advertise their annual week of cheap travel for children, during which children accompanied by an adult, were eligible for an 87½ per cent. reduction in fares. The poster is of particular interest because it bears a striking resemblance to that originated by the Southern Railway Company in this country. The engine shown is much more like one of that company's "King Arthur" Class than a Polish type of locomotive



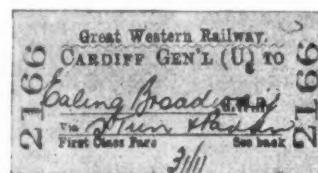
87½%
ZNIĘKI
NAJMILSZYM
TURYSTOM
POLSKIE KOLEJE Państwowe
przyjazne w cenie
od 11 do 21 lipca 1938 r.

DZIECIOM DO LAT 14-lu. — PODRÓŻYACI Z OPIERUENIEM NA PKP — 87½% ZNIĘKI
Za okazaniem paszportu i dokumentów na pokładzie pociągu, dla dzieci do lat 14, zniżka 87½%.
Za okazaniem paszportu i dokumentów na pokładzie pociągu, dla dzieci do lat 14, zniżka 87½%.
Karty załącznictwa upoważniają do skorzystania z przewozu na kolejce linowej Zakopane-Kasprowy Wierch za 87½% ceny biletu normalnego.
Cena za przejazd w obie strony zł 120.

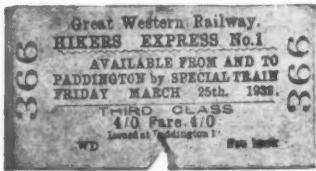
LIGA POPIERANIA TURYSTYKI



Officer's ticket at two-thirds fare, with military vignette, Midland Railway



Single ticket with blank destination, Great Western Railway



Ticket for destination unknown to the passenger—the first mystery train, run by the G.W.R. in 1858

Tickets with blank destination (four-fifths of full size) reproduced from "Passenger Tickets," by the late Professor Lionel Wiener



Return ticket of 1870, Belgian State Railways, on joint service with Liégeois-Limbourgeois Railway

arbitration again. I shall try and take advantage of the competition by going to Peterborough, a distance of 76½ miles, for 1s. They take persons to York now for 3s. 6d. !

March 4, 1856.—The North Western and Great Northern Railways are mad again. They now take one, by their fast trains, to Manchester and back, third class, for 5s.

August 17, 1856.—I had the pleasure on Saturday of being driven down to Richmond by a drunken engine-driver who took us clean through stations we ought to have stopped at, much to the alarm and anger of the passengers.

December 1, 1856.—Accidents on the railways abound at the present time—one a day is about the average.

September 25, 1857.—Yesterday was a busy day of accidents on the Great Northern Railway.

October 1, 1857.—The jury appointed to enquire into the cause of the Great Northern accident have in their verdict explained their opinion that sufficient control is not exercised over engine-drivers in regard to speeds they travel at. There is only one thing that could have caused the accident, and that is the speed, upwards of 64 miles per hour.

July 9, 1858.—There was a short time back, a bad accident on the South-Eastern Railway near Chilham, owing to the driver going too fast round a very sharp curve.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

NEW SOUTH WALES

Results for the Period July-December, 1940

In the six months ended December 31, 1940, the returns of earnings and working expenses of the Government Railways were :—

Six months ended Dec. 31	Earnings	Working expenses
1939 £10,520,698	£7,042,549	
1940 £11,984,143	£7,503,060	
Increase £1,463,445	£460,511	

The net improvement was, therefore, just over £1,000,000.

Floods Affect Railway Services

In early January, very heavy rain over the western and north-western portions of the State caused extensive flooding and washouts of railway track at many points. Hundreds of square miles of the States of Queensland and New South Wales were temporarily under water. Extraordinary concentrations of waters on the Molong-Dubbo, the Northern and the North Western lines destroyed bridges, culverts, and tracks. For some days neither passenger nor goods traffic could be accepted for conveyance over some sections, but strenuous efforts on the part of permanent way staff made possible the restoration of most services within a week or ten days.

[On page 706 will be found illustrations depicting some of the damage caused on the Molong-Dubbo line and the severity of the floods.—ED., R.G.]

WESTERN AUSTRALIA

Half Year's Result

Results for the period July-December, 1940, show an improvement for the period of £119,869, the loss to date being £104,806 as compared with a loss of £224,675 for the first six months of the financial year 1939-40.

Water Shortage and Flood Damage

The water position is again becoming serious, because of the continued dry weather, the quantity of water stored in railway dams being 137,000,000 gal. less than on December 31, 1939. Extensive haulage of water has been necessary in the Southern District. Improvements to catchment areas, cleaning out of drains, etc., are in hand so that full advantage may be obtained from any falls of rain. In contrast to the dry conditions existing over the bulk of the State, heavy rains fell in some of the agricultural areas in December, notably in the Central District. An exceptionally heavy local rainstorm in November caused damage to the permanent way on the Ongerup branch washing out one end of a bridge and scouring ballast at several points.

A mechanical coaling plant of 80-ton capacity was recently completed and

brought into use at Katanning, and it is reported to be operating satisfactorily.

IRAQ

Railway Technical School

A railway technical school has recently been opened in Baghdad, and 68 students are now in training there. Of these 16 are secondary school graduates, who, after two years' training in Baghdad, will be sent to England for three years to specialise in engineering and traffic working. The remainder are from intermediate schools and will be trained entirely in Iraq for less important posts.

THAILAND (SIAM)

State Railways in 1939-40

The route-mileage of the State Railways system on March 31, 1940, was 1,935 miles open for traffic and 113 miles under construction. During the financial year ended on that date the following earnings and traffics were recorded :—

	1938-39	1939-40
Gross earnings (Bahts) ...	15,288,225	17,831,252
Working expenses (Bahts)	7,160,455	8,200,509
Net traffic earnings (Bahts) ...	8,127,770	9,630,743
Passengers carried (number) ...	5,722,766	6,949,430
Freight carried (tons) ...	—	1,442,146
About 11·7 Bahts = £1.		

CHINA

Yunnan Railway Rails for Other Lines

It is known that, as a safeguard against Japanese invasion upon that front, the Chinese Government in Chungking has had some 50 or more miles of the Chinese section of the French Yunnan Railway dismantled from the Indo-China frontier. The materials so released are believed to have been used to complete the Kunming-Chuching section of line recently opened and running for about 100 miles eastward from the capital of Yunnan towards Chungking. It is also possible that some of the material has been used west of Kunming on the Yunnan-Burma construction.

MEXICO

National Railways Absorb New Line

The National Railways administration has recently taken over the management of the Ixacaquita-Petalingo Railway, a 72-km. line, opened in 1940, and managed successively by the Ministry of Communications and the Mexican Railway Company on behalf of the National Government. It traverses a productive area in the State of Puebla.

Punto Penasco-Santa Ana Construction

The Ministry of Communications has earmarked 14,000,000 pesos for a beginning to be made on the construction of the 324-km. Punto Penasco-

Santa Ana railway, and tenders have been invited for the supply of 60 km. of rails. The line will open up valuable agricultural areas, the farming communities of which have requested the Government to consider the construction of four feeder roads each estimated to cost about 200,000 pesos.

URUGUAY

New Construction on State Railways

The construction of a 25-mile line between Sarandi del Yi al Norte and Banquillo by the Uruguay State Railways has received Government approval, and 900,000 pesos have been earmarked for the purpose.

SWITZERLAND

Progress of New Works

Of the larger schemes at present being carried out, the formation and bridge-work construction of the four-track deviation between Berne and the junction at Wilerfeld was completed towards the end of last year, and by April last tracks had been laid throughout and most of the overhead equipment and signal bridges erected. Simultaneously, the eastern end of Berne station had been enlarged and re-arranged to permit of connection with the new approach, two tracks of which it is hoped to place in service by the late summer. The Berne - Wilerfeld deviation, includes a large concrete bridge over the Aare and a viaduct.

Doubling on the Sisikon-Fluelen and Taverne-Lugano sections of the Gottard line is proceeding steadily, and the boring of the second single-track Massagno tunnel, near Lugano, was completed in November, 1940. The second track from Pfäffikon to Lachen, on the Zurich-Sargans route, was placed in service in March last.

Brünig Line Electrification

The electrification of the Lucerne-Meiringen section of the metre-gauge Brünig line is scheduled to be completed by the autumn of this year, and the level section from Meiringen to Interlaken is to be converted by the spring of 1942. In view of the higher speeds which will be permitted, new signalling is being installed, with both home and distant signals mostly of colour-light type. The permanent way has been improved, and curvature reduced at various points, in one instance (near Giswil) by an entire relocation of the line.

Holiday Season Tickets

In connection with the celebration of the 650th anniversary of the Swiss Confederation, the holiday tickets introduced last year will again be available but under still more convenient conditions, as a minimum stay of five days at one particular resort is no longer required. With a view further to encourage travel to more distant parts of the country, the rates for conducted parties and schools, which were already very low, have been still further reduced for distances of over 100 km.

MODERN OBJECTIVES IN STEAM LOCOMOTIVE DESIGN

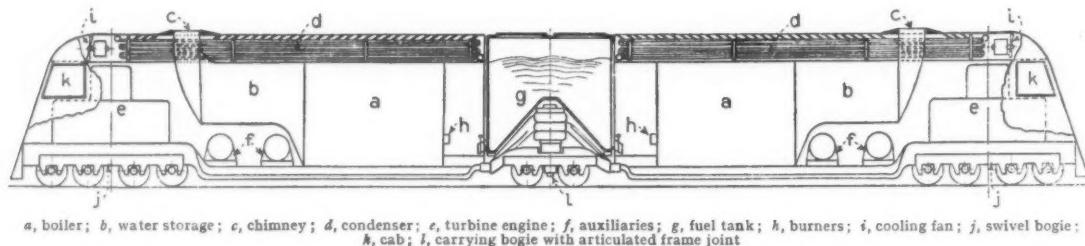
Summary of a paper by Mr. R. M. Ostermann in which were outlined a number of suggested improvements aimed at increasing locomotive efficiency both thermally and as a traffic machine

A HIGHLY interesting paper was contributed by the Railroad Division for presentation at the annual meeting in New York, on December 2-6, of the American Society of Mechanical Engineers. In his opening the author, Mr. R. M. Ostermann, Vice-President of the American Superheater Company, rightly stated that the possibilities of increasing the thermal efficiency at the drawbar of the steam-driven locomotive, fired by coal or oil fuel, have by no means been exhausted and he went on to state his conviction that, in order to strengthen the relative importance of the steam-drive principle, it would be desirable in the future to keep in view certain objectives in the design of steam locomotives.

These were summarised as (1) to reduce substantially the need for engine-house servicings and repairs, thereby increasing the availability of steam locomotives; (2) to decrease the cost of fuel and water; (3) to arrange to carry a larger percentage of the total locomotive weight on driving axles so as to provide enough adhesion for the large torques required in quickly starting and accelerating trains; (4) to increase the operating radius of the steam locomotive with a

the most advanced types of steam distribution gears, cope with expansion ratios which would ensure a gain of 50 per cent. in adiabatic heat drop. If the diameter of the cylinders were large enough, and if cut-offs were small enough to permit adequately large expansion ratios, insurmountable starting and balancing problems would arise, not to speak of the impossibility of lubricating the valves and cylinders with the very much higher pressures and temperatures. There is, in fact, only one type of steam-expansion machine which is practical for as large adiabatic heat drops as are required for lowest steam rates, and that is the steam turbine. The torque of the steam turbine is readily adjustable and absolutely uniform, like that of an electric motor. High operating speeds and small weight per horsepower may be readily combined with reliability of operation under conditions of its operation with ultra-high steam pressures and temperatures.

The only objectionable characteristic of the steam turbine which has prevented its being directly coupled with the variable-speed drive shaft of a locomotive or other traction machine is the extravagant steam consumption when the turbine is operated at speeds other than that for which it is



Design for a condensing turbine locomotive with direct drive

given fuel and water supply; (5) to lower the centre of gravity of the locomotive so as to make it suitable for higher speeds on curves; (6) to reduce track stresses by lowering or eliminating altogether the dynamic augment of axle loads, and (7) to obtain as many of the foregoing advantages as possible without an undue increase in the weight of the locomotive per horsepower, of its length, its cost and the maintenance expense. He also expressed the view that there were no insurmountable difficulties in the way of reaching these objectives.

As to thermal gains, it is clear that by generating steam at a sufficiently high pressure and by superheating it to the highest practical degree, a great increase in economy can be obtained. In expanding such steam to the now customary exhaust pressures, the steam rate per horsepower hour of a 200 lb. per sq. in. superheated engine can be reduced by 50 per cent. without exceeding boiler pressures which have been successfully used elsewhere. Furthermore, it is safe to assume that with a complete revision of the locomotive boiler plant, with proper firing control and with fine pulverisation of coal or adequate atomisation of heavy oils, fuels can be burned with a far greater furnace efficiency than is possible with the present steam locomotive firing method. The combined boiler and furnace efficiency of a hard-working coal-fired locomotive is scarcely higher than 60 per cent.; with properly controlled furnaces efficiencies of 80 per cent., on the other hand, are obtainable, even with high heat releases. Thus it is quite conceivable that with the mentioned increases of heat drop, and with refinements in the combustion of fuel, the resulting fuel savings for each indicated horsepower hour might reach 60 to 70 per cent.

Single-expansion reciprocating engines cannot, even with

designed. The turbine is inherently a constant-speed machine and would be too wasteful of steam when coupled directly to the driving wheels of a locomotive and operated at a constant steam pressure over such wide ranges of speed as may be encountered in locomotive practice. While compromise designs of turbine blades have been perfected with which it is possible to maintain a reasonably constant steam rate over a fairly wide range of speeds, with a sacrifice of highest possible blading efficiency at the best rotative speed, it will still, in the author's opinion, be desirable to make special provisions against an unduly high steam consumption of the turbines in starting a locomotive and during sustained runs at unusually low speeds such as may occur on long upward grades. The author suggested the necessity for more thought in the direction of furthering the practical chances of a direct steam-turbine drive because he believed that the best combination must be one which is usable with any operating requirements, and in the interests of a far-reaching locomotive standardisation.

Reference was made by the author to steam locomotive developments in which power would be transmitted to the axles of wheels arranged in bogie form, using electrical or hydraulic variable speed drives. He said that the ideal drive arrangement from his point of view would be one by which a high-speed turbine of small weight was directly-coupled to three or four small-wheel driving axles of a bogie and in which the turbine could be compounded at starting and in the lower speed range with some sort of directly-coupled auxiliary engine. Such a locomotive might have a maximum drawbar pull of about 115,000 lb. (51 tons) and might be built for various maximum horsepower outputs. The drawing

(Continued on page 705)

ELECTRIC TRACTION SECTION

Conductor Rails

MANY railways operating low-voltage d.c. lines simply specify the maximum resistance when ordering conductor rails, and for the most part have left it to contractors to settle the composition of the steel that would fulfil this requirement. But it has been found that the same results in regard to conductivity were being obtained with rails of very different composition, and an investigation was made some years ago with the composition which would give the best results in freedom from corrosion under various atmospheric and working conditions and yet would have good wearing properties without appreciable reduction in conductivity. The main conclusion reached, as detailed on the two succeeding pages was that the conductivity and resistance to corrosion had both improved since the last war. That further improvements might be possible by the use of special rail shapes was considered only briefly; yet a field for general improvement seems to lie in this direction, as may be seen by glancing at the two conductor rail sections we have chosen to illustrate Mr. Onslow's report, one of which is British and the other French.

Electric Locomotives in Japan

A FAIR number of electric locomotives for passenger, freight and shunting duties has been built within the last eight or nine years for the Japanese Government Railways by Japanese firms, principally to designs and detail drawings prepared by the Ministry of Communications. In general, the designs were based on the locomotives supplied by English Electric and Brown-Boveri in the dozen years after the 1914-19 war, and all are for service on the standard 1,500-volt d.c. system with overhead current collection and 3 ft. 6 in. gauge tracks. One of the leading express passenger types is classified EF 56, and has the 2-Co+Co-2 wheel arrangement. The weight is 109 tonnes and the overall length 65½ ft., but the one-hour rating is only 1,810 h.p. The top service speed is limited to 60 m.p.h., and an oil-fired boiler is installed for steam heating the train. Another passenger type, for use on heavily graded routes, is of the 1-Co+Co-1 layout and is classified EF 11; the one hour output is the same as that of the EF 56 class, but the top speed is limited to 40 m.p.h. and regenerative braking equipment is incorporated. The working order weight is 97½ tonnes and the overall length 57½ ft. Within recent years semi-streamlined four-car multiple-unit trains have been introduced in the electrified areas round Tokyo, Yokohama, and Kobe.

Further Electrification in Sweden

ELECTRIFICATION on the Swedish State Railways has reached a point not attained before, in that all the lines on which electric traction can show a clear profit have been converted to the standard single-phase system, or are in process of conversion. But war conditions have made imperative the use of national fuel to the maximum possible extent, and therefore despite the tightness of the loan market and the scarcity of certain raw materials, the Riksdag has sanctioned some of the proposals of the State Railways to convert further lines. The Vännäs-Boden section of the long main line to Lapland is now the only line under conversion, and when it is completed within the next 12 months, 90 per

cent. of the traffic on the State lines will be handled electrically. The conversions put forward by the administration of the State Railways which the Riksdag will not yet sanction are Varberg-Borås-Herrljunga (127 km.), Borås-Alvesta (149 km.), and Herrljunga-Vänernsborg-Uddevalla (92 km.), the cost of electrification of which is estimated at kr. 43,000,000. The proposals which have received Government sanction involve the conversion of the Änge-Sundsvall (95 km.), Gäfle-Ockelbo (38 km.), Hälsingborg-Hässleholm (77 km.), and Hälsingborg-Eslöv (49 km.) lines, all of which have junctions with the present electrified system. The estimated cost of conversion is kr. 34,000,000, of which kr. 15,000,000 is to be advanced during the financial year 1941/42 and the remainder during the ensuing year.

New Gotthard Locomotives

OUR Swiss correspondent reports that the first of a series of six electric locomotives for general service on the 15-kV single-phase Gotthard line of the Swiss Federal Railways was recently placed in service. As is now frequently the practice, the electrical equipment was supplied jointly by Brown-Boveri, Oerlikon, and Sécheron, and the mechanical part by the Swiss Locomotive & Machine Works, Winterthur. The locomotive is generally similar to one-half of the 12,000-h.p. articulated Gotthard line engine shown at the Swiss National Exhibition at Zurich in 1939, and very fully described in our Electric Traction Supplement for July 21, 1939. By lightening various parts, however, it has been possible to dispense with the centre carrying axle comprised in the earlier type, and the new unit, therefore, has the wheel notation 1-Bo-Bo-1. Taring 106 tonnes, and with a maximum speed of 125 km.p.h., the locomotive has an output of 5,700 h.p. (4,200 kW) and a tractive effort of 17·7 tonnes (39,000 lb.) at 84 km.p.h. (52 m.p.h.) on the one-hour rating, and a continuous output of 5,400 h.p. (4,000 kW) at 87 km.p.h. (54 m.p.h.). The maximum starting effort is 28 tonnes (61,750 lb.). Two locomotives may be coupled together under multiple-unit control, and will doubtless prove exceedingly flexible in operation, as they can be used singly for lighter passenger trains, and on heavy goods and passenger trains as a double unit equivalent in power to the earlier articulated locomotive, which can, of course, only be operated economically if hauling heavy loads.

Electrification and Traffic

A ROUGH idea of how electrification extensions cease to be profitable when applied to lightly-trafficked branch lines can be gained by considering one or two European systems. When the Swiss Federal Railways had 62 per cent. of its route mileage electrified 80 to 85 per cent. of the total traffic was hauled electrically; now, with 72 per cent. of the system electrified, the traffic handled electrically has increased only to 90 per cent. Similarly, when 40 per cent. of the route mileage of the Swedish State Railways was converted the electrically-hauled traffic was 75 per cent. of the total, but when about the beginning of next year the long northern line to Boden is converted and 53 per cent. of the route mileage electrified, the traffic handled electrically will be approximately 90 per cent. Further examples of electrified lines with dense traffic are given on another page. Such electrifications are only natural, but they tend to emphasise the question which has cropped up in England, as to just when conversion ceases to pay, and whether it is possible to stop electrifying after a certain stage.

Conductor Rails

A study of their electrical conductivity, wear, and corrosion

By D. V. ONSLOW

Some time ago a report on third rails was drawn up by Mr. Onslow on behalf of the British Electrical & Allied Industries Research Association. It still forms a valuable survey of the subject, and by the kindness of the Council of the Association, and Mr. E. B. Wedmore, Director and Secretary, we are able to reproduce this report below

MODERN conductor rails do not appear to vary much in conductivity, but rails of different composition may vary considerably with regard to their wearing qualities and loss due to corrosion. There are many variables, such as density of traffic and impurities in the atmosphere to account for this. Investigations have been made into the composition of conductor rails with a view to the improvement of the electrical resistance in relation to their wear and corrosion-resisting properties. These requirements appear to be mutually exclusive, since to obtain the highest electrical conductivity the iron must be as pure as possible and it will consequently be more subject to frictional wear.

The question of painting or treating the rails and of altering the section to give a reduced surface have been considered, but it was concluded that the cost of the former would outweigh the gain in increased life, and in the case of the latter difficulties would arise with fishplating. The conclusion was reached that the corrosion properties of modern conductor rails had been improved in the past 20 years, but that further improvement in resistance to corrosion might be obtained by the use of copper-bearing steel with the loss of about 10 per cent. in conductivity, and at a somewhat higher cost of about 12½ per cent.

Resistivity of Conductor Rails

In buying rails most railway companies specify that the electrical resistance must not exceed a certain figure, leaving it to the steel makers to decide the composition which will fulfil this requirement. Rails of the same resistivity are obtained with different compositions, which give different wear and corrosion-resisting properties.

Impurities in the iron increase the resistivity, silicon being the worst. Carbon comes next, and then manganese, the ratio for the three impurities being approximately 1½-1-½. Anything added to improve the wear and corrosion-resisting properties will increase the resistivity. Copper has about the same effect as manganese. The rails have to be of a

chemical composition to give the lowest resistivity consistent with durability, and with this object in view they are made low in carbon and manganese, a normal composition of a modern conductor rail being as given in Table I. This steel, which is an acid Bessemer steel, gives a resistivity of 15·9 microhms per 100 lb. yard at 60° F. and a tensile strength of 22·2 tons per sq. in. Older rails tested had a resistivity of about 18 microhms per 100 lb. yard.

The electrical resistance of rails can be calculated approximately from the chemical analysis, but it is not comparable with an ascertainment by actual test. It is approximately

Table I

Carbon	...	...	...	...	...	...	...	0·030 per cent.
Silicon	...	...	...	...	...	...	...	trace
Sulphur	...	...	...	...	...	...	...	0·028 per cent.
Phosphorus	...	...	...	...	...	...	...	0·023 "
Manganese	...	...	...	...	...	...	...	0·080 "
Chromium, copper, arsenic, nickel	...	...	...	...	...	...	...	0·065 "
Iron (by difference)	...	...	...	...	...	...	...	99·774 "

correct when applied to a given make of steel, varying somewhat with different makes. Mr. H. E. Wright, of Dorman, Long & Co. Ltd., has given the following method of calculation: it is taken that the iron content of the rail will give a resistance of approximately 14 microhms per 100 lb. yard, and that each 0·01 per cent. of the elements listed in Table II will add the given resistance per 100 lb. yard.

The question of making a composite rail in which copper was rolled along the web was considered a few years ago by

Table II

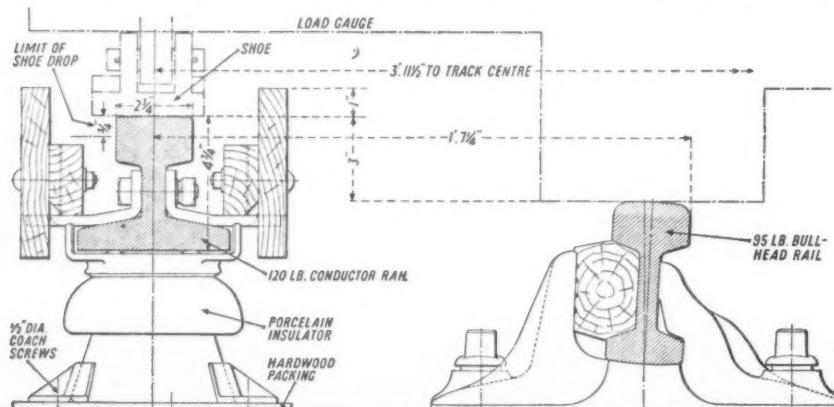
Silicon	...	...	...	...	...	...	...	0·25 microhm.
Carbon	...	...	...	...	...	...	...	0·12 "
Manganese	...	...	...	...	...	...	...	0·08 "
Copper and chromium	...	...	...	...	...	...	...	about 0·10 "

* Between carbon and manganese, data being insufficient for greater precision

one of the railway companies in consultation with the steel manufacturers. It was considered possible to insert a copper band in a conductor rail of special design, but the cost of the rails was thought to be disproportionate to the advantages to be derived. The section would have had to be altered from the normal type to enable the copper band to be introduced.

Wear and Corrosion

The average life of conductor rails is estimated by many railway companies as being 33 years, and rails are expected to last this length of time without undue loss from frictional wear and corrosion. But it is appreciated that some rails may require renewal after 20 years, whereas others may last 50 years. On lines in the open, a small percentage of the total wear is due to abrasion and some due to corrosion, wear being also assisted by corrosion. On underground railways



Layout of the 120-lb. conductor rail now in use on the 600-volt d.c. Tyneside electrified lines of the L.N.E.R.

the wear is mostly due to abrasion, and corrosion does not arise except on outside parts of the line.

As a rail becomes smaller in section the losses increase and there is greater voltage drop. In some cases rails are taken up when they are mechanically unsafe, and not because they have lost weight. In other cases rails have not been taken up when they should have been, a great deal depending on the density of traffic, and it is a question of equating the losses. In some cases 120-lb. and 150-lb. rails are now being used, but the general tendency appears to be to standardise the 100-lb. rail.

Rails corrode to a different extent in different parts of a line, and in some cases where bad corrosion has taken place the rails were in good condition a little further along the line. Conditions also vary in different areas. One or two rails in a mile may behave badly although the others do not. Corrosion is specially bad near the sea and rivers, and wear is greatest where heavy current is being taken by the shoes, and at starting places. On the City Widened Lines (L.P.T.B.), where there is also steam traffic, heavy corrosion takes place, but in the Blackfriars tunnel where atmospheric conditions are not good, the loss is mostly due to wear and not corrosion, the conductor rail being sheltered.

To divide up the total loss of weight as between wear and corrosion, the loss in depth of head (due to wear) is measured by calipers, and the weight so obtained deducted from the total weight lost to give that due to corrosion. Some of the loss in depth of head is also due to corrosion, the products of corrosion being continually removed by the collector shoes.

Some analyses and corrosion tests were made by Mr. E. H. Saniter (United Steels Companies Limited) and Mr. H. E. Wright, on some old conductor rails furnished by the Southern Railway, one sample (A) being about 18 years and the other (B) about 29 years old. For comparison a standard-type modern conductor rail (C) made by the acid Bessemer process was also tested. (A) rail weighed 100 lb. a yard when

Table III

Rail.	Analysis					Ultimate stress, tons/sq. in.	Resistance microhms per 100 lb. yard at 60°F.	Sulphur Print
	C	Si	S	P	Mn			
A	0.10	tr.	0.062	0.010	0.30	19.45(1)	18.36(2)	Slight segregation.
B	0.08	tr.	0.086	0.039	0.33	22.32(1)	18.54(2)	Heavy segregation.
C	0.03	tr.	0.028	0.026	0.11	22.2	15.9	Slight segregation.

(1) Calculated from Brinell numbers. (2) Calculated from the analysis.

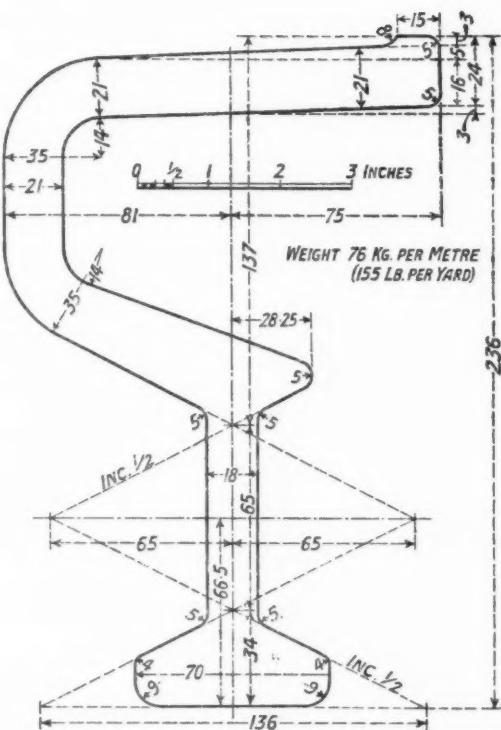
new, and had lost 44 per cent. in weight; (B) weighed 100 lb. a yard and had lost 55 per cent. in weight. The composition and other properties of the rails were as given in Table III.

The results of the tests showed that the modern rail was more resistant to corrosion than the others, and had a lower electrical resistance. The old rails would probably be more resistant to wear, and their higher electrical resistance was due to more carbon and manganese.

Copper-bearing Steel

Resistance to wear and corrosion cannot be obtained by modifying the composition without sacrificing electrical conductivity. The purer and softer the iron the greater is the wear, and the purer the iron the higher is the resistance to corrosion.

In cases of bad corrosion, where steels are subject to corrosion due to damp or fume-laden air, dilute acids, etc., copper-bearing steel is now largely employed. These steels are not particularly better against saline types of corrosion, but where the corrosion is due to acid, such as in tunnels, they stand up better than other steels. The evidence as to the effect of additions of copper on resistance to corrosion in ordinary saline solutions is conflicting and inconclusive. The amount of copper added is not more than from 0.2 to 0.5 per cent., as above 0.6 per cent. the copper precipitates. This addition of copper puts up the electrical resistance 10 to 12 per cent., and the cost of the material is about 12½ per cent. more than ordinary steel. The reduction in the rate of corrosion is shown from tests to be about 20 to 25 per cent. The tensile strength of copper-bearing steel is much the same as ordinary



Unusual shape of heavy conductor rail as used on the 650-volt d.c. Etat suburban system in Paris, French National Railways

steel, though the addition of copper does increase the tensile strength somewhat.

If this material were used for conductor rails, in order to compensate for the increase of 12 per cent. in resistivity it might be necessary to increase the weight by an equivalent amount, though since it would maintain its life longer it might not require the extra section. It is a question whether the reduction in the rate of corrosion will compensate for the higher resistivity and cost, and copper-bearing steel will be no better than ordinary steel where wear is due to heavy current being taken.

Treatment of Rails and Shape

The question of case-hardening the rails was considered, but it was not thought that it would last long. Quenching increased the electrical resistance without increasing much the resistance to wear. Various suggestions for painting or otherwise treating the rails were considered. It was thought that it might be advantageous to dip the new rails in bituminous paint and scrape off the top surface, or similarly coat the existing rails. The cost of painting rails was about £15 to £20 per mile per annum, and it was considered that the cost would outweigh the gain in increased life, presuming that the rails were painted every four years. Painting would only be necessary where corrosion was heavy, and it would be necessary to wire-brush the rails before painting.

A suggestion was made that the rails be allowed to rust, and the rust then be scraped off and the rails painted. It has been found that where this procedure had been followed in the case of ships, the iron had not rusted again. The rails might be pickled and painted afterwards, but this was considered to be too costly, and similarly with galvanising.

The less surface the section of the rail had, the less loss there would be by corrosion. Also if the flanges were narrowed and made thicker there would be less surface to corrode, but a wide bottom flange was required for stability. It was suggested that a square rail might be used to give a reduced surface, but fishplating difficulties were likely to arise, as in the case of some rectangular rails which had been tried on underground railways.

American Electrical Convention

Miscellaneous electric traction subjects were discussed at the last annual meeting of the electrical divisions of the A.A.R.

SEVERAL important subjects were dealt with at the 1940 convention of the Electrical Sections of the Association of American Railways, and abstracts of some of the reports and discussions are given below.

Electrolysis

The only method of completely preventing leakage of stray currents through foundations and guys of structures when connected to negative rails is either to eliminate the potential between rails and earth or to insulate completely the structures from the rails. It is impossible to eliminate potential between rail and earth, and the practice recommended by one of the reports is to limit leakage through foundations to a reasonable value. Experience on the Illinois Central Railroad with 1,500 volts d.c., has indicated that 2 in. or 3 in. of concrete around the reinforcing steel, guy rods and other metallic members will sufficiently limit the current values, but another practical method was to cut a strain insulator into the guy itself.

Some railroads had discovered leakage currents as high as 100 amp. flowing from concrete foundations supporting an overhead catenary construction, but other lines reported no more than 0.5 amp., even though the concrete was in wet ground. It was suggested that the location of the reinforcing steel was an important factor, and experiments had been made with insulating substances mixed with the concrete. Most of these reduced the strength of the concrete, but one had been found which did not, and this was now being tested.

A report on the electrolytic corrosion of insulation hardware stated that the use of lead shims in cross-span construction had proved to be the most effective method used on the Chicago, Milwaukee, St Paul and Pacific (3,000 volts d.c.). On the Delaware, Lackawanna & Western (3,000 volts d.c.) the corrosion of the insulators in the Bergen tunnel was mitigated by the insertion of electrolysis rings which shunted the leaking current from the fitting to the ring.

Rail Bonding

As a general rule the 4/0 U-type bond was preferred by lines operating at 1,200 volts d.c., and above the 250,000 circ. mills 13½-in. bond by lines using 600 volts d.c. For the welding of bonds there was a preference for gas welding, only one line using both electricity and gas. This railway reported that gas had a tendency to soften the ends of specially-treated rails, whereas arc welding did not, and also that the cost of applying electrically-welded bonds was about 25 per cent. higher than for gas welding.

Miscellaneous

Tests were being conducted by the Pennsylvania Railroad to determine the reasons for fatigue failures in contact wires. Preliminary findings indicated that most failures were caused by injuries to the upper lobe of the wire, and progressive fracture proceeded from these points to a total failure.

Discussing the design of motor supply circuits, the report on motor applications emphasises the considerable savings which can be effected by an increase in the copper sizes above the requirements based on current-carrying capacity and voltage losses.

Dealing with improvements in high-tension cables, the report referred to the use of carbon-black impregnated paper as a wrapping immediately adjacent to the conductor of an oil-filled cable, the function of the paper being to absorb incipient deleterious formations—soapy compounds of oil and copper in the oil—and shield them from the action of the electrostatic field. Another development was a tightly-wound elastic paper wrapping which did not work loose with repeated heating and cooling cycles, and was expected to have a longer service life. A third development was a gas-filled cable, which incorporated in a three-phase cable a continuous copper tube in one of the three interstices; this arrangement gave greater

ease of distribution of the gas along the cable, and rendered feasible a gas supply and control at one end of the cable.

Another report covered in a general way the control schemes of modern American a.c. locomotives, and those selected for description were: three preventive coils; one preventive coil with buck and boost transformer; tap changer with resistor; motor-generator set and d.c. motors; phase-converter and three-phase motors. Prevention of sleet formation was dealt with, but without adding to the information given in THE RAILWAY GAZETTE for March 7, pp. 249-50.

Notes and News

Norwegian Damage.—According to the U.S. Department of Commerce the damage done to the Norwegian State Railways during the war is valued at kr. 14,500,000, but only two electric locomotives were completely destroyed. Others were damaged, and it is probable that among the 32 units of rolling stock which were destroyed would be included some of the electric motor-coaches operating round Oslo.

Swiss Power Station.—The Swiss Federal Railways are to co-operate with the Nordostschweizerische Kraftwerke (N.O.K.) in forming a company for the construction and working of a hydro-electric power station at Rapperswil on the Aare and close to Aarau. The S.B.B. already own and work the Etzel power station, near the lake of Zurich, in partnership with the N.O.K.

Electrification in Spain.—Electrification projects in Spain were at almost a complete standstill during 1940, but some progress was made in the conversion of the Mataro-Barcelona section of the Barcelona-Arenys del Mar line. Authorisations were conferred for the resumption of work on the Madrid-Villalba-Segovia-Avila sections of the Norte main lines, but the latest reports say that no outdoor work was begun in 1940.

Cleaning Electric Locomotives.—For the cleaning of the running and certain of the driving mechanism of electric locomotives the Swiss Federal Railways use water at a temperature of 80° to 90°C. and under a pressure of 200 to 225 lb. per sq. in. at the big sheds. Water from the main hot tank is forced into pipes leading to the cleaning nozzles by an electrically-driven pump. Attempts to introduce the air close to the nozzles gave too great a cooling to the water.

French Motor-Coach Acceleration.—The fast motor-coaches which operate as single-units on accelerated stopping trains between Paris or Chartres and Le Mans on the 1,500-volt d.c. electrified system of the French National Railways showed accelerations on test from rest to 50 km.p.h. in 9 sec., to 75 km.p.h. in 19½ sec., to 100 km.p.h. in 34½ sec. to 125 km.p.h. in 55½ sec. and to 150 km.p.h. in 92 sec., the average acceleration right up to top speed being over one m.p.h. per sec. per sec. The one-hour rating is 825 h.p. and the tare weight 38½ tonnes.

Electric Traffic Density.—How lines with great traffic are usually electrified first is shown by the fact that when a year or two ago 9½ per cent. of the route mileage of the Norwegian State Railways was electrified, 19 per cent. of the traffic was handled electrically; corresponding figures of a year or two ago were 12 per cent. route mileage and 26 per cent. of total traffic on the Italian State Railways, 5 per cent. of route mileage and 17 to 20 per cent. of total traffic on the Paris-Orleans Railway, and 16½ per cent. route mileage and 21 per cent. of total traffic on the Austrian Federal Railways which made most of its early conversions because of heavy grades and awkward tunnels. Figures for the Swiss Federal and Swedish State Railways are referred to editorially.

LOS ANGELES RIVER BRIDGE COLLAPSE, SANTA FE RAILWAY

Curious result of a record wet season in California

THE wettest season for 48 years has recently been experienced in Los Angeles, California, culminating on March 4 in a flood in the Los Angeles river, which—though not by any means of record volume—was sufficient to cause the collapse of one of the piers of the Atchison, Topeka & Santa Fe Railway skew bridge carrying the main line over the river. The result was that a 200-ft. through truss span and a 90-ft. through girder span fell into the river and were destroyed. Several suggestions are put forward as to the cause of the collapse of the pier, presumably due to undermining. The bridge was built in 1901, and in 1919 its substructure was protected with steel sheet piling. Erosion under the pier foundation may have been due to changes in the channel during recent years, to the building of a sheet pile bulkhead across the river some distance upstream causing the current to swing across the channel towards the collapsed pier, or to the failure from old age of the protective piling; alternatively the failure may have been due to a combination of these three possible causes. At any rate, an investigation is proceeding, and it is significant that army engineers had previously prepared a scheme for the improvement of this part of the river channel, which included the relocation and reconstruction of the pier that collapsed. The railway was to build a temporary pile and trestle bridge to carry the traffic until a permanent bridge could be built to replace the damaged one.

Right: General view of the Santa Fe Railway skew bridge over the Los Angeles river after the collapse of the foundations causing the pier in the foreground to tilt and deposit the 200-ft. through truss span and the 90-ft. plate girder span (in the foreground) into the bed of the river.



MODERN OBJECTIVES IN STEAM LOCOMOTIVE DESIGN (Concluded from page 700)

reproduced at p. 700 shows a tentative arrangement of a direct-driven turbo condensing locomotive suggested by the author.

The author also dealt with the subject of the use of condensing apparatus and showed how one requirement of the most desirable steam locomotive leads to others. These he summarised as: (1) minimum fuel cost demands ultra-high boiler pressures and steam temperatures; (2) ultra-high pressures demand water-tube boilers for reasons of weight; (3) water-tube boilers operated with ultra-high pressures demand pure feedwater; (4) pure feedwater demands condensation and promises to all railways freedom from frequent stops for water replenishments and also washings and boiler repairs. As was stated, the main difficulty in the way of using steam condensation on locomotives is the size, weight and power requirements of the condenser. He urged further studies of this aspect of locomotive development, believing that a practical solution of the condenser problem is vital for demonstrating the best there is in steam for locomotive propulsion.

The Nizam's State Railway

A preliminary review of the working of the rail-road-air services of H.E.H. The Nizam's State Railway for the year ended March 31, 1941, shows estimated gross earnings of Rs. 305 lakhs, working expenses of Rs. 158 lakhs, and net earnings of Rs. 147 lakhs. Owning 1,302 route-miles of railway, the administration also works for the Government of India the 22 miles of the Bezwada Extension Railway and the 36 miles of the Dhone Kurnool Railway. Deducting the Rs. 8 lakhs of net earnings accruing to the Government of India in respect of these worked lines, the estimated balance

Automatic firing and boiler feed controls were another serious design problem. For the very high pressures now used and regarded as essential, only those boilers are light enough which consist of tubes and which have, of necessity, a very small heat storage capacity. These boilers are very sensitive to the quick load changes that occurred so often in locomotive operation. Hand firing of either coal or oil, as well as overfeed stoker firing of coal does not seem to be practical with a condensing locomotive for the reason that the locomotive should be so fired that there is no loss of steam from the boiler safety valves in order that such a loss may not interfere with the conservation of the water supply. Hence the firing must be automatic and the heat supply adjusted in some way to the boiler's steam demand without undue lag.

In conclusion the author stated that he had no illusions as to the size of the task which has to be achieved before his objectives can be reached and, finally, he paid tribute to the efforts of those who had already done so much to advance the cause of steam in locomotive propulsion.

of net earnings of the Nizam's State transport system for the year 1940-41 is Rs. 139 lakhs, against Rs. 122 lakhs for the previous year. Gross earnings for the year under review constituted a fresh record. Railway working expenses increased only by about Rs. 1 lakh on account of the increased contribution to the depreciation fund as a result of the increased gross earnings. New air-conditioned railcar services at only a little over the ordinary third class fare were started on April 15, 1940, and have been well patronised. Road-service route-miles increased by 60 during the year, and these services now cover 4,142 miles of road, operated on 131 routes.

Flood Damage on the New South Wales Government Railways

(For brief description see page 699)

Views of the damage to the Molong-Dubbo line which suffered severely. Right : Molong end of bridge mile 257 ch. 43, the remainder of which was completely washed away



Left : View of Little River bridge mile 276 ch. 20, from the Molong side, showing the subsidence of a pier and flotsam lodged on pier caps. The girders of this bridge were to be lifted on to timber trestles until permanent repairs could be effected



Washaway at mile 262 ch. 07



Hanover bridge from Dubbo end

RAILWAY NEWS SECTION

PERSONAL

The board of Vickers Limited has agreed to release Sir Charles Craven to take up the newly created appointment of Controller of the Ministry of Aircraft Production.

L.M.S.R. STAFF CHANGES

Mr. J. G. Hodgkinson, Assistant to District Goods & Passenger Manager, Leicester, to be Assistant District Goods & Passenger Manager, Northampton, *vice* Mr. R. Paterson, promoted.

Mr. R. Paterson, Assistant District Goods & Passenger Manager, Northampton, to be Goods Agent, St. Pancras and Somers Town, *vice* Mr. H. Tandy, promoted.

Mr. J. Bissett, District Traffic Agent, Aberdeen, to be Goods Agent, Aberdeen, *vice* Mr. M. Dick, retired.

L.N.E.R. APPOINTMENTS

Mr. A. A. Harrison, Road Motor Superintendent, North Eastern Area, has been appointed Cartage Manager, North Eastern Area, as from June 1.

Mr. R. W. Hotham has been appointed Horse & Sack Superintendent, North Eastern Area, from the same date.

Mr. E. W. Rostern, who has been acting as Assistant Superintendent, Southern Area, has been appointed Assistant Superintendent (Western Section), Southern Area, in succession to Mr. J. Lees, who retired at the end of May.

Mr. K. A. Kindon, Assistant to the District Goods & Passenger Manager, Nottingham, has been appointed Assistant District Goods & Passenger Manager, Nottingham, as from June 1.

INSTITUTE OF TRANSPORT SCOTTISH SECTION

The officers and committee for the 1941-42 session are as follow: Mr. R. Beveridge (Chairman); Messrs. J. Cairns and J. H. Hannay-Thompson, Jun. (Vice-Chairmen); Mr. Thos. Gray (Hon. Treasurer); Mr. Laurence C. Greig (Hon. Secretary); Messrs. J. Amos, T. E. B. Chalmers, J. R. Cowper, A. Henderson, R. B. Herbert, J. G. Hopkin, J. W. Loudon, R. McLeod, G. Mills, A. Morton, J. Ness, A. H. Roberts, J. I. Tennant, G. S. Vickary (Committee); Messrs. J. Budge and J. C. McNab (Hon. Auditors).

Mr. F. C. Velton, the Great Western Railway Company's Irish Traffic Manager, has been elected Chairman of the City of Dublin Skin & Cancer Hospital for a second term of office.

Mr. Edward Rowlandson Ross, Guildford, late General Manager of the Beira & Mashonaland and the Rhodesia Railways, has left £37,359 (net £37,296).

Mr. E. L. Reese, Chief Clerk to the Cardiff District Goods Manager, Great Western Railway, who was appointed an Assistant District Goods Manager, Cardiff, on March 31, began his railway career at Shrewsbury in 1901, and after 12 years in the Shrewsbury District was transferred to South Wales, where he saw service in the Cardiff and Newport District Goods Managers' offices. In 1930 he was appointed Cartage Clerk, Cardiff District Goods Manager's Office, and six years later became Clerk-in-

Highland Railway between Craigen-dor and Fort William. In July, 1900, he became an engineering assistant in the District Engineer's office, York, North Eastern Railway. He was later appointed Chief Draughtsman and then Assistant District Engineer, the position from which he now retires. An interesting family link with early railways is given in "The Family of Whatton, A Record of Nine Centuries," written by the late John Swift Whatton, M.A., Trinity College, Cambridge, in which



Mr. E. L. Reese

Appointed Assistant District Goods Manager, Cardiff, G.W.R.

Charge of the General Section there. In 1938 he was appointed Chief Clerk to the Cardiff District Goods Manager, which post he has left to take up his new duties.

Mr. William Kelly Wallace, Chief Engineer, London Midland & Scottish Railway, has been elected President of the Institution of Structural Engineers for the 1941-42 session.

Mr. Patrick L. Fleming has been appointed to succeed the late Mr. A. W. Bolden as Chairman of the Nitrate Railways Co. Ltd., and Mr. Arthur G. Hunt has been elected to a seat on the board.

Mr. G. W. Whatton, Assistant District Engineer, York, L.N.E.R., retired from railway service on May 31. Mr. Whatton was born and educated in Glasgow and received his early training in the Engineer's office (Western Division) of the North British Railway, Glasgow, during which period he saw the building and opening of the West



Mr. G. W. Whatton

Assistant District Engineer, York, L.N.E.R., who has retired

reference is made to the historic railway accident which resulted in the death of William Huskisson at the opening of the Liverpool & Manchester Railway. Mr. Huskisson was attended by William Robert Whatton, a famous surgeon practising in Manchester. Mrs. Huskisson, the widow, afterwards presented Mr. Whatton with a gold snuff-box in grateful recollection of his skill and unwearied kindness.

BALTIMORE & OHIO RAILROAD

At a meeting of the directors, held on April 30, the office of Chairman of the board of directors was created and Mr. Daniel Willard was elected to the office.

Mr. Roy B. White is Mr. Willard's successor as President, his election to become effective as soon as he was relieved from his duties as President of the Western Union Telegraph Company.

Mr. Willard's resignation as President was accepted, to take effect when his successor is in position to assume the duties of that office.

Mr. White was in the service of the Baltimore & Ohio Company 25 years,



British Railways and the War—74

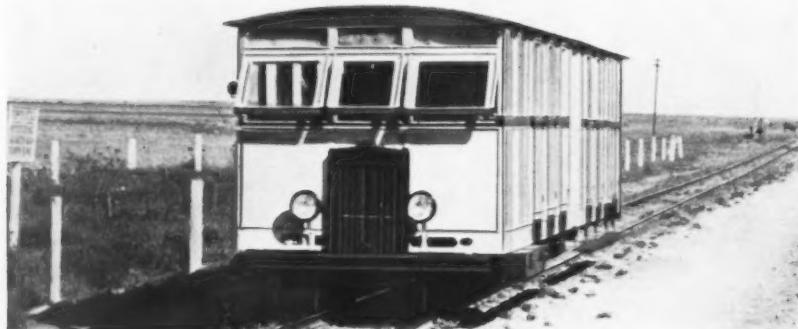
Cyprus Government Railway

(See page 711)

Above : Train No. 3 at Famagusta, headed by 4-4-0 locomotive No. 11



Above : Railcar train at Nicosia station, Cyprus Government Railway



Left : Railcar No. 5, Cyprus Government Railway, in passing loop at Stylos

Right : Ford-engined petrol railcar No. 6 and three trailers in Famagusta station, Cyprus Government Railway



Photos]

[W. Dendy

advancing during that period from the position of Telegraph Operator & Station Agent to General Manager of the New York Division. In 1926, he resigned from railway service to become Senior Vice-President of the Central Railroad of New Jersey, and was shortly thereafter made President of the company. In 1933, Mr. White resigned to accept the presidency of the Western Union Telegraph Company, which position he still holds.

Mr. Charles W. Stokes, European Publicity Manager of the Canadian Pacific Railway, has been seconded to the Ministry of Information for special services in the Commercial Relations Department, for which he is well qualified by wide experience in Canada, the United States of America, and Great Britain. Mr. Stokes came to live in London eleven years ago from Canada, where he lived many years, and where he held various offices in advertising circles, having been President of the Montreal Advertising Club, Canadian Director of the A.B.C. (the present American organisation), and President of the American Association of Railway Advertising Agents.

Mr. P. D. Troskie, System Manager at Johannesburg, South African Railways and Harbours, has been appointed Chief Traffic Manager at headquarters, Johannesburg. Mr. Troskie joined the railways at the beginning of 1912 in the Assistant General Manager's Office at Bloemfontein. He was transferred in 1915 to Windhoek, where he remained for two years and was then transferred to the General Manager's Office, Johannesburg. In 1925 he was appointed to the Railway Board Office and at the end of 1929 became private secretary to the Minister of Railways and Harbours and to the Railways and Harbours Board. Two years later he became Superintendent (Operating Commercial and Staff) in Johannesburg. In 1932, he was transferred in a similar capacity to Capetown and remained there until 1935, when he was appointed System Manager at Bloemfontein. In December, 1936, Mr. Troskie was appointed Chief Superintendent (Staff) at headquarters, and retained that position until 1938, when he was appointed System Manager in Johannesburg. While occupying the position of Chief Superintendent (Staff) he was for two years Chairman of the Railway Conciliation Board. In 1937 he was a member of a committee of S.A.R. experts who attended the International Railway Congress in Paris.

Mr. C. E. Rooke, Superintendent of the Line, Nigerian Railway, has recently arrived in this country on leave.

We regret to record the death on June 10 of Mr. Robert Pooley, O.B.E., London Manager of the Shelton Iron, Steel & Coal Co. Ltd. Mr. Pooley, who was 67 years of age, joined the firm of Messrs. Livesey & Henderson in 1889

and remained with them until 1911 when he went to the Shelton Iron, Steel & Coal Co. Ltd., and subsequently became London Manager. During the last war he was loaned to the Government and received an O.B.E. for his services.

We regret to record the death in Toronto on June 16 of Mr. Edward Rogers Wood, the Canadian financier, at the age of 75. Mr. Wood was President of the Central Canada Loan & Savings Company and Vice-President of the Rio de Janeiro Tramway Light & Power Company; the Sao Paulo Tramway Light & Power Company; and the Brazilian Traction Light & Power Company. He was also on the board of the Barcelona Traction Light & Power Company and of various other commercial companies.

AWARDS FOR GALLANTRY

The following awards to railwaymen have been announced:

British Empire Medal (Civil Division).

Joseph Great, Engineman, L.N.E.R. A ship was damaged and on fire. The engine-room was flooded to a depth of 11 ft. and the water level was still rising. Two tugs endeavoured to pump out the water, but were unable to cope with the inflow. Great volunteered to get into the engine-room and locate the trouble. He discovered and sealed a fracture in the main ejector valve. The tugs were then able to cope with the inflow of water.

Frank Edward Martin, Dock Checker, Great Western Railway.

During an air raid Martin tackled many fires caused by incendiary bombs. When a lorry loaded with timber caught fire, he removed the timber and prevented the fire from spreading, although the petrol tank was likely to explode. Under his supervision a trailer pump was taken to a large fire and, as a result of the arrangements he made for relaying the supply of water, much valuable property was saved.

Commendations

George Edward Lewis, Shunter, Great Western Railway.

William Toye, Shunter, Great Western Railway.

Among those who attended the funeral of Lt.-Colonel H. H. Mauldin, Divisional General Manager, L.N.E.R., in addition to the list given in THE RAILWAY GAZETTE of June 13, were the following:—Mr. Frank Gilbert, Mr. C. E. R. Sherrington (Secretary, Railway Research Service), Mr. G. F. Thurston (ex Divisional General Manager), Mr. C. J. Selway (ex Passenger Manager), Mr. P. W. Painter (representing the General Railway Signal Co. Ltd.), and Mr. T. E. Thomas (General Manager, London Passenger Transport Board, and President, Institute of Transport).

Questions in Parliament

Railway Wagons

Captain A. M. Lyons (Leicester East—C.) on June 17, asked the Secretary for Mines, whether he had yet completed arrangements with the Minister of War Transport to ensure the prompt clearing of coal wagons in sidings by coal merchants, and others.

Mr. David Grenfell: Yes, Sir, and the figures of clearance show that there has been progressive improvement in this matter since the beginning of the year.

Captain Lyons: Subject to war circumstances, can the Minister say what steps will be taken to safeguard the position as compared with a year ago?

Mr. Grenfell replied that if by a year ago Captain Lyons meant last winter, there had been some improvement. He could not guarantee that it would be maintained, but there was an abundant supply of empty wagons at the present time, and there was likely to be for some time.

Mr. Neil Maclean (Govan—Lab.): Considering that in some places coal is being sold at 3s. a hundredweight and that prices above that figure are due to the cost of freightage, can he not have something done in regard to cheapening the cost of transport?

Mr. Grenfell said that he could not do that.

Mr. T. Levy (Elland—C.) said that unless something was done with regard to the distribution of coal, it would not be long before some munition factories had to close down.

Harvesting Grass by Tracks

Sir Joseph Lamb (Stone—C.) on June 17 asked the Parliamentary Secretary to the Ministry of War Transport, what arrangement had been made by his department to ensure that the grass growing on the sides of railway tracks, estimated to be approximately an area of 70,000 acres, was made available for use as stock food in the form of hay during the present cutting periods.

Colonel J. J. Llewellyn replied that the arrangement made with the railway companies last year whereby farmers were allowed to harvest grass on any railway slopes adjoining their farms was being continued this season and farmers wishing to take advantage of it should apply to the local station-master.

Parliamentary Notes

Progress of Railway Bills

The Railway Clearing System Superannuation Fund Corporation Bill was reported, with amendments, to the House of Lords on June 17.

The London Midland & Scottish Railway Bill was read the second time in the House of Lords on June 18.

TRANSPORT SERVICES AND THE WAR—96

Civilian air raid casualties in May—Cyprus Government Railway—Railways and the war in the Near East—European communications

The following air raid casualty figures for the month of May have been issued by the Ministry of Home Security:—

Killed, 5,394.

Injured and detained in hospital, 5,181.

Of the killed, 2,512 were men, 1,994 women, 753 children under sixteen, and 135 unclassified.

Of the injured, 2,930 were men, 1,835 women, and 416 children under the age of sixteen.

In addition, 75 persons (31 men, 25 women, and 19 children) are missing and believed killed.

Requisitioning of New Privately-Owned Railway Wagons

From time to time last year the Minister of Transport by virtue of his powers under Regulation 53 of the Defence (General) Regulations, 1939, requisitioned all privately-owned railway wagons. Orders were made at frequent intervals—in all seven were issued in 1940—each covering vehicles which had been built since the date specified in the previous Order. The first of these Orders to be made this year is that dated May 31, 1941 (S.R. & O., 1941, No. 811). This is the first of the series to be made by the Minister of War Transport following the amalgamation of the Ministries of Transport and Shipping and relates to all privately-owned railway wagons, the construction of which has been completed since December 17, 1940. From the date of this Order the Railway Executive Committee is empowered to exercise, on behalf of the Minister, his powers in relation to these wagons, and in the absence of any directions to the contrary by the Railway Executive Committee requisitioned wagons which are already upon, or are afterwards brought upon, the system of any controlled railway company will be used interchangeably with railway-owned wagons. As has been customary in these requisition Orders, certain classes of railway wagons are exempted, such as tank wagons; wagons for special traffics, including cement, copperas, lime (roofed wagons only), night soil and sewage, nitre cake, salt, and tarred materials; wagons not suitable for running on main lines; registered wagons reserved for internal use at collieries and works; specially-constructed wagons; wagons used for

working over private railways only; and wagons restricted to working over a particular portion of a railway company's line.

War Transport Councils

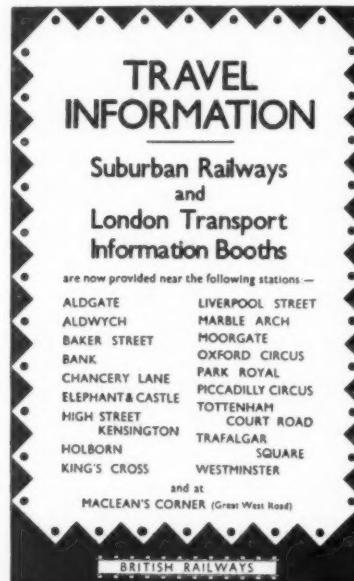
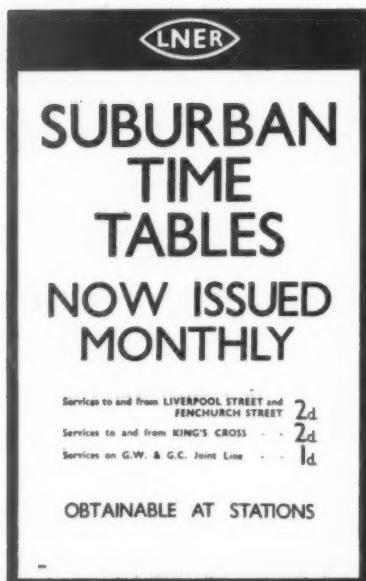
In consequence of the merging of the Ministries of Transport and Shipping, the Ministry of Shipping Advisory Council has been renamed the Shipping Advisory Council, and the Ministry of War Transport Council has become the Inland Transport War Council. As briefly recorded in THE RAILWAY GAZETTE of June 20, the vacancy in the latter body existing since the death of Lord Stamp has been filled by the appointment of Sir Ronald Matthews, Chairman of the L.N.E.R. It has also been decided to add to this body a member with special knowledge of coastwise shipping; Mr. Robert Kelso, Chairman of the General Steam Navigation Co. Ltd. has been appointed accordingly. Coastwise shipping is represented on the Shipping Advisory Council by Sir Alfred Read, J.P.

Ministry of War Transport : Public Relations Officer

In response to a question in the House of Commons, the Chancellor of the Exchequer recently supplied a list giving the names and salaries of the chief press officers attached to the Government Departments. Mr. Fleetwood C. Pritchard, Public Relations Officer, Ministry of War Transport, was shown as receiving £1,700 per annum.

Standard Borders for L.N.E.R. Letterpress Posters

Apart from announcements issued on the authority of the Railway Executive Committee, multifarious posters issued by Government Departments and national bodies continue to make their appearance from time to time on the advertisement boards of the British railway companies, as a small part of the railway contribution to the war effort. In order, therefore, to give distinction to purely L.N.E.R. letterpress posters, that company's advertising manager has adopted a



Three recent railway posters: Left and right, two of the L.N.E.R. with standard borders (see paragraph above); middle, one issued by the Railway Executive Committee

new standard blue border embodying the L.N.E.R. totem. Two such posters are reproduced, and we understand that this border will be used by the L.N.E.R. for all future general letterpress posters.

Municipal Cloakrooms for Tube Shelter Bedding

The Westminster City Council has inaugurated at street level at Leicester Square tube station a well-equipped municipal cloakroom for the bedding of shelterers at underground stations. The shelterers leave their bedding, which they must roll into neat bundles and hand over to the uniformed attendant at the cloakroom counter in the morning, and collect it again at night. The charge is 1s. a week for each bundle, which may contain more than one set of bedding. There is room in the well-spaced airy racks for more than 500 bundles, and all are occupied. The Westminster City Council is negotiating for premises at other stations. Laundry services for shelterers have also been arranged in the City of London and Westminster areas. Bedding is collected, washed, and returned the same day at reasonable prices. The service is being extended to other deep-level shelters.

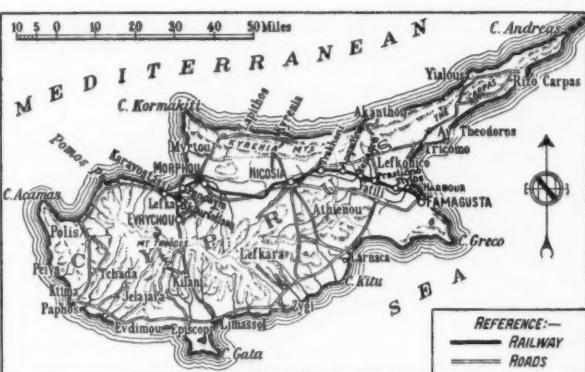
The Cyprus Government Railway

The success of the German air invasion of the island of Crete, made from the captured bases on the Greek mainland, which—despite stubborn resistance on the part of British, Imperial, and Greek Forces—resulted in the Allied abandonment of the island on June 1, brought the island of Cyprus more immediately into the war zone. It occupies an important strategic position between Crete and the mainland of Asia Minor, where German activities in Iraq and Syria have given some evidence of a further extension of the *Drang nach Osten*.

The Cyprus Government Railway is a 2 ft. 6 in. gauge line with a route length of 76 miles. The first 37 miles from Famagusta Harbour to Nicosia, the capital, were begun in April, 1904, and opened in October, 1905. By December, 1907, the extension to Morphou, 27 miles west of Nicosia, was completed. In June, 1915, a further extension of 14 miles to Evrychou, in the Troodos hills, south-west of Morphou, was opened to provide for the development of the copper mines at Skouriotissa, but the last war delayed this project. In January, 1922, the first train of ore left the mines for Famagusta harbour, whence the ore was shipped to Europe. During that year, 1,200 tons of ore were shipped to England from Famagusta, but since then all shipments have been made from Morphou Bay. In connection with this, a four-mile branch line was built to connect the main-line with the new jetty at Karavostassi, and was completed early in 1920.

The rails, 30 lb. a yd., are spiket to timber sleepers. The ruling gradient is 1 in 100, with curves of 20 chains radius, between Famagusta and Nicosia; and 1 in 60 (compensated) between Nicosia and Morphou, with curves of 10 chains radius. Between Morphou and Evrychou there are gradients as steep as 1 in 30. There is only one tunnel on the line—at the entrance to Famagusta station. Except here and at Nicosia, the stations are very simple. Nameboards and notices are written in three languages—English, Greek, and Turkish. There are passing loops at five stations, with water towers at two, replenished during the summer by a tank car from Famagusta, where the supply is more abundant and suitable for boilers. The headquarters offices and railway works are at Famagusta, where all major repairs can be carried out, in addition to the building of wagon, coach, and lorry-bodies. Incidentally, the copper used in the works has to be imported from England, as, although the island exports large quantities of copper ore, it has no smelting facilities. There are no signals, but trains are controlled by electric train staff in conjunction with the electric telegraph. Sidings are controlled by Annett's key.

There are four classes of locomotives in use, three of which were built by Nasmyth Wilson in 1904 for the opening of the first section. These comprise 4-4-0 and 2-6-0 tender engines, with interchangeable boilers, and 2-6-2 tank engines, the motion and wheels of which are interchangeable with the 2-6-0 locomotives. In 1915, the remaining class, of 4-8-4 tank engines, was ordered from Kitson's for the extension to Evrychou. There is one odd engine, an 0-6-0 tank built by the Hunslet Engine Company of Leeds, which was left by the contractors after the opening of the line in 1905, and is



Cyprus and its railways

now no longer in service. About 45 locomotives in all are available, and they are painted black with red lining. The passenger stock is composed of 17 comfortable bogie saloon coaches with end platforms. The third class have wooden seats, but first and second class are upholstered; there are some brake composite coaches. Automatic couplings and vacuum brakes are fitted throughout to passenger and goods vehicles, but some of the latter are only piped. The goods stock, totalling about 100, consists mainly of 8-wheel bogie vehicles—open wagons, box vans, and a few combined goods-brake vans. Many of the wagons were imported from the Egyptian light railways after the last war. Most of the passenger traffic is now operated by seven Ford petrol railcars hauling one or more trailers, the bodies of which were all built at Famagusta.

Except for the mineral traffic between Skouriotissa and Karavostassi jetty, operated by the Cyprus Mines Corporation with American-built locomotives, the line west of Morphou is closed to traffic. Between Nicosia and Morphou only goods traffic is worked, though a road passenger service is in operation. Thus only the 36 miles between Famagusta Town and Nicosia has a regular passenger service. Before the outbreak of the present war, the timetable showed three trains daily in each direction on weekdays, but none on Sundays; they were booked to stop at all stations. Two of the three services were run by railcars, doing the 36-mile journey in just under 2 hr., while the third service was operated by a steam train, generally of mixed composition, taking 2½ to 3 hr. On Saturdays and Mondays one of the railcar services was supplemented by a steam train. There was also a daily morning service from Prastiono into Famagusta, and on Fridays only there was an early morning return service between Nicosia and Trakhoni for the market. The railway administration also operates motorbus services from Nicosia to Lefkara Xero, and Morphou, on the western section of the line, and between Prastiono and Lefkonico. Road distribution services for goods are maintained by 14 lorries from Famagusta, Lefkonico, and Nicosia. At Famagusta harbour there is a deep-water quay with modern warehouse accommodation, extensive sidings, and crane facilities. (See illustrations on page 708.)

The Iraq Conflict and the Baghdad Railway

Information which has recently come to hand clearly indicates that the conflict between the British Forces and the Iraqi Forces operating under the instruction of the Raschid Ali administration was even more closely associated with control of communications—and, in particular, the Baghdad Railway—than was at first generally realised in this country. It will be recalled that, in accordance with the terms of the Anglo-Iraqi Treaty of Alliance, Imperial Forces arrived in Basra in the middle of April to open up lines of communication through Iraq. The Raschid Ali administration (which had seized power on April 1) at first welcomed the Imperial troops, but subsequently took exception to the strengthening of these Forces. Early on the morning of May 2 hostilities broke out when the Imperial Forces were attacked by the Iraqis. After the former had taken strong action to enforce the exercise of the treaty rights, the Iraqi rebels asked for an armistice on May 31; this was signed the same day and fighting was

discontinued. Raschid Ali fled from the country into Iran and subsequently various documents came to light indicating that the rising, though ill-timed, was made with the connivance of Germany but not in accordance with German requirements as to detail. The German Minister in Baghdad is said to have informed Raschid Ali that Germany could not immediately give any assistance owing to the delay which had been caused to German plans in the Near East by British support to Greece. Nevertheless, Raschid Ali decided to launch his venture before British troops were further strengthened, and later (when the Iraqis were clearly in retreat) Raschid Ali made a further appeal for German help, and was then assured that it would be forthcoming on condition that Iraq recognised the original concession granted to Germany by Turkey for the Baghdad Railway; that Iraq transferred to Germany the concession for the Kirkuk oilfield; and that Germany be given control of all Iraqi aerodromes for the duration of the war. It would seem that Raschid Ali was prepared to accept but that four generals who were giving him the support of the Iraqi army declined to co-operate to this extent. The sequel was the flight of Raschid Ali and the request for an armistice by the Iraqi army.

The British Treasury announced on June 14 that, in view of the improved position in Iraq, the directions making all payments out of accounts of residents in Iraq subject to permission were withdrawn as from Monday, June 16. Residents in Iraq are, therefore, free to make sterling payments anywhere in the sterling area or to one another. Railway communications between Basra and Baghdad, interrupted since the first week in May, are reported to have been restored on June 12.

Progress of the Campaign in Syria

One of the earliest steps of the Imperial British Forces in their advance into Syria was the occupation on June 8 of the important railway centre of Deraa junction, thus restoring rail communication between Palestine and Trans-Jordan by securing possession of the section on Syrian soil of the railway from Haifa to Trans-Jordan (of 3 ft. 5½ in. gauge) which traverses Syrian soil between El Hamme and Nessib, *via* Deraa.

Another column of Allied troops advancing along the coast reached Tyre on June 8, and on the next day effected a crossing of the River Litani. Sidon was occupied on June 14, as a further step in the advance towards the important port of Beirut which is the terminus of the 3 ft. 5½ in. gauge line from Deraa through Damascus and Rayak to the coast. Damascus was occupied by Allied Forces on June 21.

Ankara reported on June 10 that British troops advancing across Syria from Iraq had reached the Turkish frontier at Kamechlie, thus securing control of the section of the Baghdad Railway from Turkey to Iraq which crosses a corner of Syria between Tel Ziouane and Tel Kotchek. Turkey is naturally particularly interested in the progress of this column, as the occupation by British Forces of Aleppo would secure uninterrupted Turkish railway communications with Iraq and the Persian Gulf. Palmyra was reached by British forces on June 23.

German Transit Through France

There have been repeated reports of German pressure on the Vichy Government to permit the passage of German troops through unoccupied France to Spain, but reliable information is lacking, not unnaturally, as it is unlikely that any official pronouncement on such a matter would be made in advance of the arrangement coming into effect. Some reference to this matter was made at page 583 of our May 23 issue.

For some time past, however, it seems that the Germans have been making extensive use of the inland waterways of unoccupied France so that their E-boats may reach the Mediterranean without encountering the dangers of the English Channel and the Atlantic. The boats travel down the Rhone as far as Arles, and from there they use the Rhone-Marseilles Canal—constructed to avoid the Rhone delta—which enters the inland lake known as the Etang de Berre, near Martigues. From there they travel along the south shore to the little village of Marignane, enter the Rove tunnel, and emerge in the Mediterranean at L'Estaque,

where there is a protected waterway to Marseilles. The Rove tunnel took fifteen years to construct, and was opened by M. Domergue, then President of the French Republic, in 1927. It is bored through the Rove hills, and is the longest canal tunnel in the world, being 4½ miles long. Two 1,500-ton barges can pass in the canal.

Railway Traffic between France and Spain

According to an announcement of the Secrétariat d'Etat aux Communications de France, Direction Générale des Transportes, dated Vichy, February 1, 1941, goods traffic between France and Spain has been organised in the following way: Direction France-Spain, through frontier stations Irun (Atlantic), Puigcerdá (Pyrenees), and Port Bou (Mediterranean); direction Spain-France, through Hendaye (Atlantic), La Tour de Carol (Pyrenees), and Cerbère (Mediterranean). According to the same communication traffic *via* Canfranc was suspended as from December 17, 1940.

The following restrictions obtain in the international goods traffic: No consignment may be booked through to Belgium or Holland, through any frontier station or by any route through France. This applies also to consignments for Great Britain, the Channel ports, and the North Sea ports. At the frontier station of Hendaye all classes of traffic consigned to this station or booked through in transit to Vichy France, Occupied France, to Switzerland (*via* Geneva-Eaux Vives station or *via* St. Gingolph), and to Italy *via* Modane or Menton, are admitted. No consignment is admitted through this frontier station addressed direct to Germany, and such consignments must be booked to Hendaye only. For all consignments through Hendaye destined for Vichy France and Switzerland a special permit must be obtained in advance from the German *Feldkommandatur* at Biarritz. The same regulations apply also to consignments from Spain sent through the other frontier stations open at present. The resumption of through goods traffic between Spain and Germany was referred to in THE RAILWAY GAZETTE of January 17, 1941, at page 78, and some details of French traffic to Germany and German-occupied countries were given in our issue of April 4 last, at page 405.

German Railways and School Holidays

School summer holidays in Germany this year are to be staggered, for which purpose the country will be divided into three areas. In the first, holidays will be from June 26 to August 16, for the second from July 7 to August 27, and in the third from July 17 to September 6. This is designed to prevent traffic peaks.

German Air Lines in 1940

The Deutsche Lufthansa A.G. has recently published the following figures for the air lines which it operated during 1940:—

Aggregate distance flown	...	...	...	...	...	5,000,000 km.
Passengers carried	...	...	...	...	...	95,000
Passenger-km. flown	...	...	...	...	...	55,000,000
Average distance per passenger flown	...	...	...	...	...	580 km.
Weight of luggage and parcels carried...	...	...	...	...	...	440 tonnes.
Luggage and parcels, tonne-km.	...	...	...	...	...	343,000
Freight carried	...	...	...	...	...	900 tonnes.
Freight, tonne-km.	...	...	...	...	...	650,000
Mails carried	...	...	...	...	...	1,000 tonnes.
Mail tonne-km.	...	...	...	...	...	946,000

About two-fifths of the lines of the pre-war system were in operation.

Railways in the Protectorate of Bohemia & Moravia

The new Minister of Transport, Dr. Kamenicky, has announced that the signalling system of the railways of Bohemia & Moravia, as well as the service regulations and the general organisation, are being made uniform with the Reichsbahn system. Similar adaptation is being made in the postal system.

Important New Rail Link in Bulgaria

The last link in the Karnobat—Chumen line—mentioned in THE RAILWAY GAZETTE of April 18, 1941, page 459—is now completed, and the line has been opened for through traffic. This is an important connection between the two main lines from Sofia to the Black Sea ports of Varna and Burgas.

Drastic Curtailment of Train Services in Sweden

In peacetime Sweden received most of its steam coal from the United Kingdom, so that this source of supply is now cut off. Consequently, drastic alterations in train services were introduced with the summer timetables on June 15. The widespread curtailment of coastwise shipping and of road transport services—due to lack of motor fuel—has thrown much additional freight traffic on to the railways, which is essential for the needs of the country. Goods traffic has, therefore, to be maintained as far as possible, and so the most severe reductions in services fall upon passenger traffic. Some of these reductions came into force on May 1, but the most serious became effective on June 15. On steam-worked sections wood fuel will be used extensively and speeds of trains will be reduced except on certain lines, where one up and one down train is run daily, passenger trains are being run on only three or four days a week. Sleeping and restaurant cars were withdrawn on June 15. Drastic reductions were also made in passenger train services on electric lines which depend upon coal for their current supplies. Reductions of fares on all lines, introduced to stimulate traffic, are withdrawn. These changes apply to both State and privately-owned and worked railways.

The War Extends to Russia

A very considerable extension of the areas of fighting took place in the early hours of Sunday morning, June 22, when German and Roumanian Forces launched attacks on Soviet territory along a lengthy front extending from the Baltic to the Black Sea. Little precise information is yet to hand but it appears that on June 23 the Germans occupied Brest-Litovsk and Bialystok, both important railway junctions in Russian-occupied Poland, and that the Roumanians have crossed the River Pruth into Bessarabia, which Russia took over from Roumania last year. A Berlin radio statement said that the Germans found that the Russians were leaving road bridges intact, but that these were insufficiently strong to take the weight of heavy vehicles, and that German sappers had found it necessary to construct separate bridges.

RAILWAY AND OTHER MEETINGS**British Electric Traction Co. Ltd.**

The ordinary general meeting of the British Electric Traction Co. Ltd. was held at Winchester House, Old Broad Street, London, E.C., on Friday, June 20. Mr. R. J. Howley, C.B.E. (Deputy Chairman) presided.

The Secretary (Mr. R. P. Beddow) having read the notice convening the meeting and the report of the auditors, the Deputy Chairman said he had been asked by Mr. Austen, the Chairman, to express his regret that he was unable to be present. Mr. Austen had been unwell for a few weeks, and had been advised to rest.

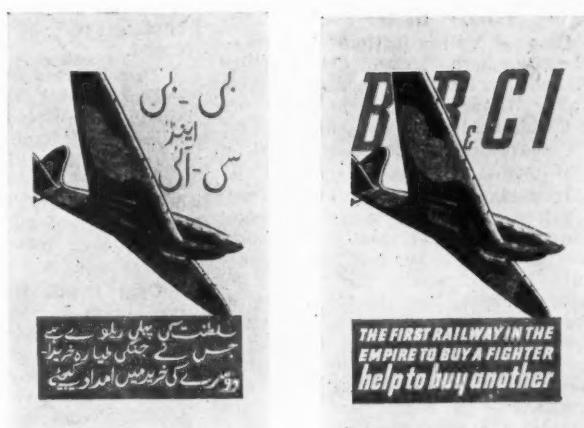
The results for the twelve months dated March 31 last showed a small increase of £2,678 in the gross revenue. The amount of £748,552 was again a high record for the company. The working profit exceeded that shown for the previous year by £3,075. Interest on debenture stocks required the same amount as last year, but as the board considered it advisable to set aside £70,000 (as against £50,000 provided in the accounts last year) as a provision against Excess Profits Tax, the net profit was £16,925 less. As to the provision made for Excess Profits Tax, no settlement had yet been come to with the revenue authorities on the amount of the company's liability for

Excess Profits Tax. The sum set aside might be more than was necessary if the directors' contentions as to the manner in which the tax should be applied to this company were accepted by the authorities.

The balance sheet showed few changes. Investments stood at £6,894,669, a decrease of £44,345; more than half of this decrease was due to the repayment of a loan by a subsidiary company. On the other hand, cash resources showed an increase of £110,486. Of the total investments, roughly 70 per cent. of the amount represented businesses which the company administered directly or through the British Electrical Federation, and 30 per cent. represented outside investments.

Mr. Austen in his speech last year had referred to the margin of some £80,000 which had remained after provision for the dividends recommended. The actual margin this year was just over this figure. He saw no reason why there should be any material change in the gross income earned by inside investments during the current year.

The company was largely interested in the supply of electricity and the provision of road passenger transport—both public utilities of major importance



Twin B.R. & C.I.R. posters at Delhi, printed in black and red on white; left in Urdu, right in English

Reports which reached this country shortly before the present invasion indicate that all, or practically all, the railways on Russian-occupied soil had been converted to the Russian gauge of 5-ft.

La Paz-Yungas Railway for Training

The metre-gauge railway from La Paz to Los Yungas, 34 miles in length, which was operated by the administration of the Arica-La Paz Railway as a part of the Bolivian State Railway system, has now been handed over to the "General Pando" Battalion, to be worked for training purposes by the military authorities.

in war time. From time to time in the press the view was expressed that all public road transport should be nationalised. It would, in his opinion, be a sorry day for the public if this should take place. Under the organisation which the company had set up, the various public utility undertakings were operated by separate companies. This had proved efficient, especially under the test of war time, because of the decentralisation of executive control, which allowed of quick decisions and the best use of available vehicles. There was a great deal to be said in favour of the personal touch between the management of the local companies and the travelling public which now existed. This would disappear on nationalisation; and the transport needs of the local inhabitants would be decided by some superman—if he could be found—on elaborate statistics compiled in great detail and at great expense.

A dividend at the same rate as for the previous year was recommended to be paid on the deferred ordinary stock, which he thought in the circumstances of the times must be considered satisfactory.

The Deputy Chairman then moved, and Mr. Sidney E. Garcke seconded, the adoption of the report and accounts, which was carried unanimously. The retiring directors were re-elected, and the auditors were re-appointed. The proceedings closed with a vote of thanks to the Chairman.

June 27, 1941

Notes and News

Clogher Valley Railway Shares.—The Northern Ireland Ministry of Finance has offered to purchase Clogher Valley Railway £10 shares at £8 10s. If a shareholder will not sell he can get his guaranteed 5 per cent. dividend continued.

Imperial Airways (Far East) Limited and Airways (Africa) Limited.—General meetings of these companies will be held on Friday, July 11, to receive the liquidator's report showing how the winding up of the companies has been conducted and their property disposed of and also to determine by extraordinary resolution the manner in which the books and accounts of the companies, and of the liquidator, shall be disposed of.

Level Crossings on the Chesapeake & Ohio.—Six level crossings on the lines of this company were replaced by overbridges or underbridges during the year 1940, and flashing light signals were installed to protect level crossings at eight points. The company has also negotiated contracts with highway departments of several of the States traversed by its lines for other important level crossing elimination projects, and it is expected that construction work will begin in the early spring of next year. Contracts have also been entered into for flashing light signals at a number of additional highway level crossings.

United Railways of the Havana and Regla Warehouses Limited.—Meetings held on June 11 of holders of six classes of debentures and debenture stocks in this company approved an extension of the moratorium scheme for two years, giving also an option to the stockholders' committee to extend it for three further separate years. Approval was also given to a provision that the proceeds of the 36,453 cumulative preferred shares of the American & Foreign Power Company, lately requisitioned by the Treasury at £4 7s. 1d. a share, and forming the specific security for the 4 per cent. debentures and debenture stock, be distributed *pro rata* among the holders of those securities by way of repayment of capital. The distribution

is estimated at £12 per £100, and present holdings will be correspondingly reduced.

Two Private Danish Lines Closed.

—Two private companies' lines, (a) Varde-Nørre Nebel—Tarm, 68 km. (42½ miles) in Jutland, and (b) Maribo—Torrig, 24 km. (15 miles) on the island of Lolland, were closed to all traffic on April 1, 1941; the lines will be dismantled, the track and other materials having been taken over by the State Railways.

Coal Production in Spain.—Coal production in Spain, which fell to an annual figure of something like 2,000,000 tons during the civil war, reached the record total of 7,763,269 tons in the year 1940, as compared with the figure of 6,089,479 tons in 1939. In the official distribution, 40 per cent. of the total production is allocated to the railways, but claims have been submitted for a higher proportion as difficulty has been experienced in some of the lines in dealing with traffic demands. Practically all the bituminous coal of Spain is mined in the northern districts; the province of Asturias accounted for 5,599,086 tons, and the adjoining province of Leon for 1,088,235 tons, of the whole.

Nitrate Railways Co. Ltd.—Presiding at the annual meeting of this company, on June 11, Mr. Patrick L. Fleming, the new Chairman, said that up to the end of April, 1940, there had been a noticeable improvement in both production and exportation of nitrate from the Tarapaca Pampa served by the railway. Nitrate imports into France, however, ceased on the partial occupation of that country by Germany, and the war in the eastern zone more or less cut off the Egyptian market also. The North American market for the time being became the main outlet for the Chilean product, but, as nitrate exports thither were largely provided for by oficinas on the Tocopilla Pampa, Tarapaca did not benefit. The tonnage of all classes of traffic amounted to 443,260 tons, or practically the same as in 1939, but gross revenue was higher, because of the increase in heavy up cargo which carried the higher freight rates.

Swiss Federal Railways in 1940.

The continued increase in traffic on The Federal Railways since the outbreak of the war is reflected in the figures recently published for the year ended December 31, 1940. Total working receipts amounted to approximately fr. 398,000,000 (of which fr. 384,000,000 were actual traffic receipts), representing an increase of fr. 36,600,000, or 10·1 per cent., over 1939. Working expenditure rose by

British and Irish Railway Stocks and Shares

Stocks	Highest 1940	Lowest 1940	Prices	
			June 19, 1941	Rise/ Fall
G.W.R.				
Cons. Ord. ...	52	22½	35½	+ 2
5% Con. Pref. (1950)	103½	58	99½	+ 1
5% Red. Pref. (1950)	105½	88	103	- 1
4% Deb. ...	107½	90½	109½	- 1
4½% Deb. ...	108½	96½	113	-
4½% Deb. ...	114½	96	116½	-
5% Deb. ...	124	106	130	-
5½% Deb. ...	66½	57	66	-
5½% Red. Charge ...	117½	97	127½	-
5% Cons. Guar. ...	117	90½	125	-
L.M.S.R.				
Ord. ...	24½	9	13½	+ 4
4% Pref. (1923) ...	60½	21½	41	+ 2
4% Pref. ...	70½	35	57½	+ 1
5% Red. Pref. (1955) ...	94½	60	84½	-
4% Deb. ...	101½	81	100½	+ 1
5% Red. Deb. (1952) ...	109½	102	108	-
4% Guar. ...	93½	65	93½	+ 1
L.N.E.R.				
5% Pref. Ord. ...	8½	1½	2½	-
Def. Ord. ...	4½	1½	1½	-
4% First Pref. ...	60	20	41	+ 2
4% Second Pref. ...	22½	6½	14	+ 2
5% Red. Pref. (1955) ...	80	34½	62½	+ 1
4% First Guar. ...	86½	56	83½	-
4% Second Guar. ...	77½	37	70½	-
3½% Deb. ...	73½	54½	74½	+ 1
4% Deb. ...	97½	74	100½	-
5% Red. Deb. (1947) ...	107	96½	104	-
4½% Sinking Fund ...	104	98	102½	-
Red. Deb. ...				
SOUTHERN				
Pref. Ord. ...	79	34	52½	+ 2
Def. Ord. ...	22½	7	12	+ 1
5% Pref. ...	104½	58½	94½	+ 1
5% Red. Pref. (1964) ...	105	85	100½	-
5½% Guar. Pref. ...	116½	90	125	-
5½% Red. Guar. Pref. (1957) ...	114½	94	113½	-
4% Deb. ...	106½	84½	107	+ 1
5% Deb. ...	122½	100	128½	-
4% Red. Deb. (1962-67) ...	106	96½	106	-
4% Red. Deb. (1970-80) ...	106½	93	106	-
FORTH BRIDGE				
4% Deb. ...	95½	87	92½*	- 1
4% Guar. ...	93½	81½	90½*	- 1
L.P.T.B.				
4½% "A" ...	116	103	115	-
5½% "A" ...	121½	107	123½	-
4½% "T.F.A." ...	105½	101	101½	-
5½% "B" ...	116	102	109½	-
"C" ...	65½	24	34½	+ 3
MERSEY				
Ord. ...	26	18½	20½	-
4% Perp. Deb. ...	92½	86½	92½	-
3% Perp. Deb. ...	68	63	67½	-
3% Perp. Pref. ...	57	50½	53½	-
IRELAND BELFAST & C.D.				
Ord. ...	4	3	4	-
G. NORTHERN				
Ord. ...	4½	1½	8½	-
G. SOUTHERN				
Ord. ...	12½	4	8½	-
Pref. ...	15½	6	9½	-
Guar. ...	36	15	28½	-
Deb. ...	55½	40	50½	-

* ex dividend

Irish Traffic Returns

IRELAND	Totals for 22nd Week			Totals to Date		
	1941	1940	Inc. or Dec.	1941	1940	Inc. or Dec.
Belfast & C.D. (80 miles)	pass. goods total	£	£	£	£	£
			No returns to hand			
Great Northern (543 miles)	pass. goods total			No returns to hand		
Great Southern (2,076 miles)	pass. goods total	47,602	36,771	+ 10,831	792,840	677,912
		40,771	41,764	- 993	1,101,952	983,236
		88,373	78,535	+ 9,838	1,894,792	1,661,148
L.M.S.R. (N.C.C.) (271 miles)	pass. goods total			No returns to hand		

IRELAND BELFAST & C.D.	Ord. ...	4	3	4	-
G. NORTHERN	Ord. ...	4½	1½	8½	-
G. SOUTHERN	Ord. ...	12½	4	8½	-
Pref. ...	15½	6	9½	-	
Guar. ...	36	15	28½	-	
Deb. ...	55½	40	50½	-	

THE RAILWAY GAZETTE

OFFICIAL NOTICES

Traffic Inspector

REQUIRED for the Gold Coast Government Railways, for two tours of 12-24 months, with possible permanency. Salary £400-£12,560 a year. Outfit allowance of £25. Free passages and quarters. Candidates, age 25-35, should have had practical experience in centralised train and traffic control and distribution of rolling stock; operation of a fair-sized marshalling yard, including shunting, marshalling, and despatch of

trains; handling of traffic at a fair-sized port and supervising the discharge of cargo into railway vehicles; and small station working and accounting. They should also possess a working knowledge of operation of trains over single and double lines by electric train staff and block telegraph; and, preferably, also of Morse telegraphy.

Write, stating age and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M.9424.

fr. 14,800,000, or 6·6 per cent., and reached a figure of fr. 238,700,000; this was due partly to the higher cost of materials and supplies, and partly to payments into the Salary Compensation Fund instituted by the Government last year. The profit and loss account shows a fr. 13,400,000 surplus, which it is proposed should be used towards covering earlier insufficient amortisations on construction capital. In an editorial note in THE RAILWAY GAZETTE of May 23, when the preliminary figures were discussed, it was stated that the net profit was expected to be about fr. 17,000,000. Passenger receipts were shown as fr. 135,450,000, and freight receipts as fr. 247,000,000.

Leman Street and Shadwell Stations to close.—The L.N.E.R. announces that on and from Monday, July 7, Leman Street and Shadwell and St. George's East Stations will be closed.

Southern Railways War Effort.—The employees of the Southern Railway Company have subscribed more than £16,000 to National War Bonds and National Savings Certificates through their station, depot, and office groups.

Census of Steel Stocks.—The Iron & Steel Control of the Ministry of Supply is taking a census of steel stocks as at June 30, 1941. In general the census follows the lines of that held at the end of 1940, which yielded results of great value in formulating Government policy as to supplies of steel. Some 30,000 undertakings are affected by the census. Finished-steel producers, structural engineers, and stock-holding merchants are not required to make returns under the census arrangements, as figures of their stocks are already regularly available.

Railway and Other Reports

Assam-Bengal Railway Co. Ltd.—Interim dividend of 1½ per cent. actual (less tax) from guaranteed interest for the half-year to June 30.

Rhodesia Railways Limited.—The ordinary dividend for the year to September 30, 1939, is 25 per cent., against 20 per cent. for the previous 12 months. Accounts were delayed owing to certain matters, including taxation, not having been settled.

United Railways of the Havana & Regla Warehouses Limited.—On July 1 a payment will be made of 5s. 2d. per cent., less tax at 10s. in the £.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Friday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

Contracts & Tenders

DANISH ROLLING STOCK ORDERS

Orders have been placed with Danish and German works for 300 goods vehicles (of which 125 are covered wagons, 125 open trucks and 50 are meat vans), for 6 heavy shunting engines and 6 heavy passenger engines of the same class as the 11 taken over from the Swedish State Railways, when main-line electrification in that country made them available. The total cost will be kr. 7,500,000 (£350,000). Contracts have also been signed with the Scandia wagon works of Randers, and the Frichs locomotive works of Aarhus for the fitting of continuous brakes to the existing goods rolling stock at a cost of kr. 2,500,000 (£110,000). All orders are expected to be completed before the end of the current financial year, ending March 31, 1942.

NEW MALMÖ-COPENHAGEN FERRY

It is reported that the Swedish State Railways are to place an order for a new train ferry vessel for the Malmö-Copenhagen service in replacement of the one which has now been running for over 40 years. The new ship is to be 308 ft. in length and 52 ft. 6 in. in beam, with a maximum draught of 13 ft. 5 in. On the train deck there will be two tracks with an aggregate length of 534 ft. Apart from the use of the train deck for passengers in emergency, there will be four other decks accommodating 1,300 first and third class passengers; if the train deck also is used for passengers instead of railway vehicles, 1,800 can be carried. The vessel, which will have an ice-breaking stem, will be driven by two 2,250 h.p. diesel engines giving a service speed of about 15 knots.

Another Section of the C.N.R.
Closing

Application by the Canadian National Railways to close the 34-mile line between Yarker and Tweed, Ontario, was granted in a judgment of the Board of Transport Commissioners made public on April 21. The board's judgment said there "is not now sufficient traffic . . . to warrant continuance of the service in face of the operating losses to the railway." Residents of the area served by the line made strong objections to the proposed abandonment, the judgment said, but existence of nearby railway facilities and roads "makes the sustained losses to the railway outweigh the loss and inconvenience to the public consequent upon abandonment."

Railway Stock Market

Aided by the further rise established in British Funds, a favourable undertone has ruled in most sections of the Stock Exchange, and on balance there has been a moderate, although fairly general, improvement in security values. An important factor has again been the firmness with which all classes of securities are held, and the many indications of willingness to be prepared to take more than a short view. There, in fact, was again no marked improvement in demand outside gilt-edged stocks, and at the time of writing the disposition is to await developments in connection with the outbreak of hostilities between Germany and Russia. Aided by the surrounding market tendency, most home railway stocks have shown further gains on balance, although best prices recorded by the junior securities in the past few days have not been fully held at the time of writing. Nevertheless, the latter remained active on hopes that the forthcoming interim dividends may be maintained, and home railway stocks generally have again attracted attention on the possibility of an official statement indicating the basis on which the financial agreement with the Government may be revised. In fact, in some quarters of the market the view is gaining ground that total dividend pay-

ments on the junior stocks may very well equal those for 1940. It may, however, be prudent at this stage to assume that in some cases slightly lower total dividends may be paid, as they may perhaps not exceed those permitted by the guaranteed minimum revenue, and, moreover, with the much increased cost of wages and materials, some form of Government subsidy may prove necessary to bring revenue up to the guaranteed level. Even so, yields at current prices would still be substantial, and there seems much to be said for the belief that home railway junior stocks are very moderately priced in comparison with those of many other companies playing a vital part in the war effort. Prior charges have now shown better response to the rise in gilt-edged, but as compared with a week ago, most gains were only fractional, although it is impossible to find other stocks with high investment merits and a free market, which offer as attractive yields.

In response to the view that the dividend may remain on a 4 per cent. basis for the year, Great Western ordinary was active, and has risen further from 34½ to 35½ on balance. At 99½ and 110, respectively, Great Western preference and debenture stocks were fractionally better, but the guaranteed stock was slightly lower at 125. Among the high-yielding preference issues, L.N.E.R.

firsts gained a further two points to 41, and the seconds were a point better at 14½. Improvement was also shown by this railway's first guaranteed, with a rise of a point to 84, and the second guaranteed was 72½, which compares with 70 a week ago. Moreover, L.N.E.R. 3 per cent. debentures moved up from 73 to 74½, and the 4 per cent. debentures from 98 to 99. L.M.S.R. stocks also reflected the improved tendency; the ordinary moved up from 12½ to 13½; the 1923 preference from 39½ to 41; and the senior preference from 56 to 57½. L.M.S.R. debentures were 101, and the guaranteed stock 94. Among Southern stocks, the deferred moved higher, from 9½ to 12½, and the preferred from 51 to 52½. Moreover, Southern preference rallied from 93½ to 95; the debentures and guaranteed stock were 107 and 125 respectively. There has again been better demand for London Transport "C," which improved further from 32 to 34, it being pointed out that, if hopes of a 3 per cent. dividend were realised, the yield would not be far short of 9 per cent. at the current price.

Very little business was reported in Argentine and other foreign railway stocks, and price movements were small and unimportant. There was again a fair amount of activity in Canadian Pacific ordinary and preference, which were virtually the same as a week ago.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1940-41	Week Ending	Traffic for Week			No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices			
			Total this year	Inc. or Dec. compared with 1940	Totals		Increase or Decrease	Highest 1940	Lowest 1940		June 19, 1941	Yield % (See Note)		
					This Year	Last Year								
South & Central America														
Antofagasta (Chili) & Bolivia	834	15.6.41	£ 19,160	+ 310	24	£ 426,490	£ 452,390	- 25,900	Ord. Stk.	11½	3½	4½	Nill	
Argentine North Eastern	753	14.6.41	ps. 179,800	- ps. 20,600	50	ps. 7,214,800	ps. 7,788,600	- ps. 573,800	ps. Deb.	3½	1	2	Nill	
Bolivar	174	May 1941	4,200	- 210	22	19,132	22,650	- 1,518	Bonds	6½	5	6½	Nill	
Brazil	...	...	...	...	...	...	...	...	Ord. Stk.	4½	1	1½	Nill
Buenos Ayres & Pacific	2,801	7.6.41	ps. 1,540,000	+ ps. 425,000	49	ps. 70,503,000	ps. 68,009,000	+ ps. 2,494,000	Dfd.	4	1	1	Nill	
Buenos Aires Central	190	19.1.41	\$7,400	- \$20,200	29	\$2,477,400	\$2,994,900	- \$517,500	Ord. Stk.	10½	3	3½	Nill	
Buenos Ayres Great Southern	5,082	7.6.41	ps. 2,113,000	+ ps. 226,000	49	ps. 109,186,000	ps. 114,521,000	- ps. 5,335,000	Ord. Stk.	8½	2	2½	Nill	
Buenos Ayres Western	1,930	7.6.41	ps. 851,000	+ ps. 134,000	49	ps. 38,739,000	ps. 38,510,000	+ ps. 229,000	Ord. Stk.	8½	2	2½	Nill	
Central Argentine	3,700	14.6.41	ps. 1,740,400	+ ps. 320,600	50	ps. 82,291,150	ps. 87,707,000	- ps. 5,415,850	Ord. Sh.	4½	1	1½	Nill	
Do.	...	...	...	...	...	...	...	...	Ord. Stk.	3½	1	1	Nill
Cent. Uruguay of M. Video	972	7.6.41	30,291	+ 5,131	49	1,148,578	1,072,291	+ 76,287	Ord. Stk.	3½	1	1½	Nill	
Costa Rica	188	April 1941	15,450	- 2,390	43	152,170	176,057	- 23,887	Ord. Stk.	23½	14	15½	12½	
Dorada	70	May 1941	12,900	- 100	22	62,100	59,100	+ 3,000	I Mt. Db.	99	97½	98	6½	
Entre Rios	808	14.6.41	ps. 245,100	- ps. 10,300	50	ps. 10,635,300	ps. 11,958,600	- ps. 1,323,300	Ord. Stk.	4	1	1½	Nill	
Great Western of Brazil	1,016	14.6.41	6,800	- 1,200	24	229,000	263,100	- 34,100	Ord. Sh.	4½	1	1½	Nill	
International of Cl. Amer.	794	Mar 1941	\$487,887	- \$103,925	12	\$1,444,383	\$1,762,134	- \$317,751	Ist Pref.	9d.	9d.	1½	Nill	
Intercosmico of Mexico	...	...	...	...	...	...	...	...	Ord. Stk.	6	4	—	Nill
La Guisla & Caracas	224	May 1941	5,235	- 1,425	22	30,145	34,675	- 4,530	Ord. Stk.	2½	1	1½	Nill	
Lima Goldmines	1,918	7.6.41	24,788	+ 5,215	23	538,056	494,353	+ 43,703	Ord. Stk.	2½	1	1½	Nill	
Mexican	483	14.6.41	ps. 259,400	- ps. 23,200	24	ps. 7,345,200	ps. 7,210,300	+ os 134,900	ps. Deb.	2/1½	1½	1½	Nill	
Midland of Uruguay	319	April 1941	11,861	- 851	43	119,846	107,251	+ 12,595	Ord. Stk.	2½	1	1½	Nill	
Nitrate	...	...	...	...	...	...	...	...	Ord. Stk.	2½	1	1½	Nill
Paraguay Central	274	14.6.41	\$3,772,000	+ \$665,000	50	\$165,986,000	\$160,809,000	+ \$5,177,000	Pr. Lt. Stk.	41	36	30½	19½	
Peruvian Corporation	1,059	May 1941	63,038	- 6,669	48	709,515	750,190	- 40,686	Pr. Lt. Stk.	4	1	2	Nill	
Salvador	100	12.4.41	€19,633	- €3,491	41	€655,104	€832,101	- €176,997	Pr. Lt. Stk.	50	23	25	8	
San Paulo	1534	8.6.41	41,250	- 237	23	840,129	826,401	+ 13,728	Ord. Stk.	15½	8	8½	Nill	
Tatral	160	May 1941	3,095	+ 555	48	30,545	28,760	+ 1,785	Ord. Stk.	15½	8	8½	Nill	
United of Havana	1,346	14.6.41	19,825	+ 879	50	1,210,621	1,225,068	- 14,447	Ord. Stk.	15½	8	8½	Nill	
Uruguay Northern	73	April 1941	1,009	- 239	43	11,317	11,242	+ 75	Ord. Stk.	—	—	—	Nill	
Canada	23,633	14.6.41	1,172,815	+ 79,393	24	25,572,359	20,413,572	+ 5,159,187	Perp. Dbs.	86	68	92	4½	
Canadian National	—	—	—	—	—	—	—	—	4 p.c.	105½	95½	101½	3½	
Canadian Northern	—	—	—	—	—	—	—	—	4 p.c. Gr.	9½	4½	8½	Nill	
Grand Trunk	17,153	14.6.41	855,000	+ 222,400	24	17,945,400	13,445,200	+ 4,500,200	Ord. Stk.	—	—	—	Nill	
India	Assam Bengal...	1,329	—	—	—	—	—	—	Ord. Stk.	99½	71	100	3	
Barsi Light	202	10.4.41	8,632*	+ 5,595	2	8,632*	3,037	+ 5,595	Ord. Stk.	283	234	303	5½	
Bengal & North Western	2,086	31.5.41	270,525	+ 37,232	9	544,425	595,649	- 51,224	Ord. Stk.	—	—	—	Nill	
Bengal Doars & Ext.	161	Sept 1940	14,625	+ 508	46	78,405	66,243	+ 12,162	Ord. Stk.	—	—	—	Nill	
Bengal-Nagpur	3,269	31.3.41	266,175	+ 11,055	52	8,989,306	8,266,447	+ 722,859	Ord. Stk.	96	83½	100½	4	
Bombay, Baroda & C. India	2,986	10.6.41	295,125	+ 4,125	10	2,231,550	2,167,425	+ 64,125	Ord. Stk.	108	99	108	5½	
Madras & Southern Mahratta	2,939	10.4.41	206,475	+ 16,779	2	206,475	189,696	+ 16,779	Ord. Stk.	104	97½	104½	7½	
Rohilkund & Kumaon	571	31.5.41	66,150	+ 3,960	9	128,925	139,568	- 10,648	Ord. Stk.	284	238	293	5½	
South Indian	2,500	10.4.41	141,529	+ 23,547	2	141,529	117,981	+ 23,547	Ord. Stk.	93½	83	97½	4½	
Various	Beira	204	April 1941	65,450	—	31	495,141	—	—	Prf. Sh.	7/10	8	1	Nill
Egyptian Delta	610	10.4.41	6,617	+ 1,362	2	6,617	5,255	+ 1,362	Prf. Sh.	—	—	—	Nill	
Kenya & Uganda	1,625	—	—	—	—	—	—	—	B. Deb.	53	44	45½	7½	
Manila	—	—	—	—	—	—	—	—	Inc. Deb.	88	80	87½	6½	
Midland of W. Australia	277	Feb. 1941	13,851	+ 1,637	35	119,604	102,871	+ 16,733	Inc. Deb.	—	—	—	Nill	
Nigerian	1,900	31.3.41	100,291	+ 53,330	52	2,494,207	2,108,686	+ 385,521	Inc. Deb.	—	—	—	Nill	
Rhodesia	2,442	April 1941	429,209	—	31	3,283,108	—	—	Inc. Deb.	—	—	—	Nill	
South Africa	13,287	10.5.41	723,137	+ 104,900	6	4,137,719	3,761,611	+ 376,108	Inc. Deb.	—	—	—	Nill	
Victoria	4,774	Feb. 1941	870,883	+ 1,583	35	—	—	—	Inc. Deb.	—	—	—	Nill	

Note. Yields are based on the approximate current prices and are within a fraction of 1/8. Argentine traffics are given in pesos

* Chaitre Fair. † Receipts are calculated @ 1s. ed. to the rupee.

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